

Animasia 3-D TM

Reference

Reference

This *Reference* manual contains detailed descriptions of Animasia 3-D. The descriptions are divided into:

- Windows — Describes the several kinds of windows, including the Tools window. Basic concepts relating to the windows are also explained.
- Menus — Describes the menu commands in the menu bar.
- Appendices — Contains miscellaneous information, such as as using animations with HyperStudio, and tips for creating effective animations.

This Reference manual should be used after having followed the lessons in the Tutorial manual.

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Window Reference

Animasia 3-D uses several different kinds of windows. In the following sections, the windows are individually explained.

The different kinds of windows are:

- World — Objects are created, edited, and animated here.
- Timeline — Objects' attributes are edited across time here. Each object has thirteen kinds of attributes that can be individually animated.
- Groups — Similar objects are managed here by classifying objects together. Groups of objects can be temporarily hidden from view.

The first three windows constitute a *project*. Every new project will have a World, Timeline, and a Groups window. A project is created by choosing New from the File menu.

The remaining windows are:

- Animation — An animation. The Play button in this window plays the animation.
- Tools — Tools and the color palette resides here. The Tools window is only used when a World window is frontmost.

With all windows except the Tools window, the title of the window will remind you what kind of window it is. The kind of window will be in (parentheses). The file associated with the window is in "quotes."

There is no limit to the amount of windows that can be open at one time.

World Window

This section describes the World window and the objects which inhabit it.

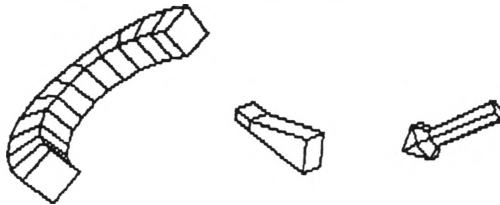
Objects

Before discussing the World window, the notion of *objects* should be mentioned. An object is a thing that has height, width, and depth; it's three-dimensional, or 3-D. An object could be a chair, a bird, or anything that has a physical shape. With Animasia 3-D, you can create these kinds of shapes, or objects, with the tools. Alternatively, Animasia 3-D can also import objects made with other software applications using the Import DXF command in the File menu. Objects are the central things that you will be creating, editing, and animating.

Objects appear only in the World window. However, the objects' *names* appear in the Timeline window.

Kinds of Objects

There are three kinds of objects:



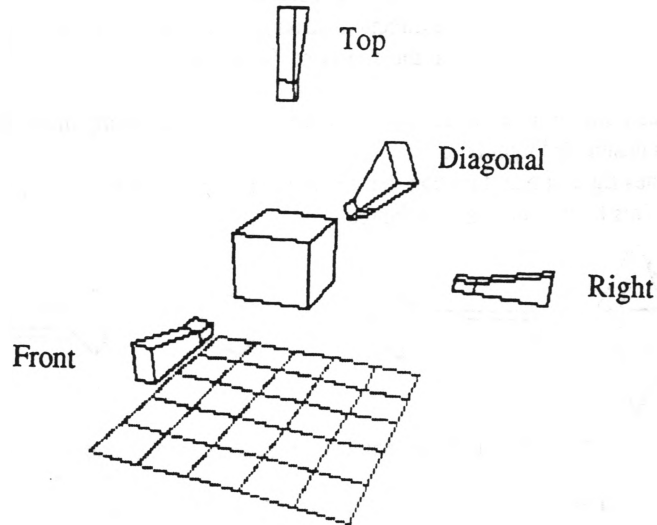
(From left to right are model, camera, and light objects.)

- **Model** — The basic kind of object that you create with the tools. This kind of object could be a chair or a bird.
- **Camera** — An object that is looked through to see other objects.
- **Light** — An object that illuminates other objects.

Kinds of Cameras

There are two kinds of cameras, which look physically the same:

- Editing — Cannot be animated, but is useful for observing object relationships from different angles.
- Animating — Can be animated to move or look at different places throughout an animation.

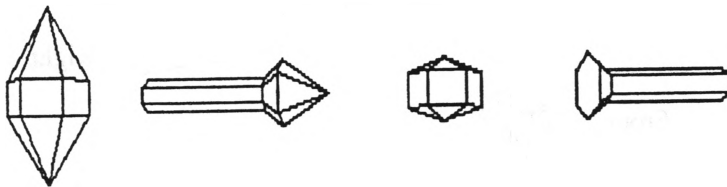


(The four editing cameras are aligned to view the cube object from the front, right, top, and diagonal directions.)

Kinds of Lights

There are four kinds of lights:

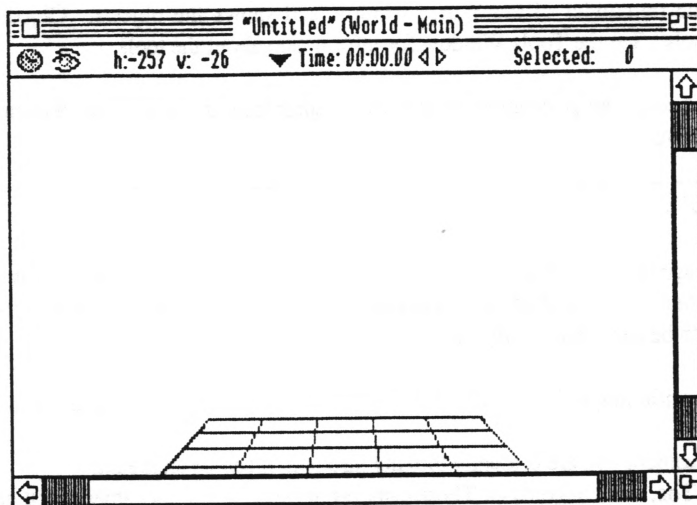
- **Ambient** — Emits the base lighting that affects all objects, even if the objects face away from all other light sources. This light ensures that all objects' surfaces will receive light. Every world contains one default ambient light; more ambient lights are not needed.
- **Directional** — Shines light in only one direction, striking objects with a constant intensity. This light mimics the effects of sunshine because the sun is so far away that its rays of light strike the earth in one direction and do not spread out.
- **Radial** — Spreads light out in all directions from one location, decreasing intensity with distance. This light mimics an unshielded light bulb.
- **Spotlight** — Shines light in one direction, but limits its influence to a cone of light. Intensity decreases with distance. This light mimics a desk lamp.



(From left to right are ambient, directional, radial, and spotlight lights.)

New lights are added to a world with the Add Lights command from the Object menu.

World Window



The World window is divided into two parts: the Info and Image areas.

Info Area

The Info area is at the top of the World window and contains items which aid working with projects and objects.

From left to right, those items are:

- Clock icon — Clicking on this icon is a shortcut to make the project's Timeline window frontmost.
- Eye icon — Clicking on this icon is a shortcut to make the project's Groups window frontmost.
- Coordinates — Shows the horizontal (h) and vertical (v) coordinates of the cursor in the window. The center of the window is the coordinate 0, 0. The coordinates range horizontally from 0 to ± 320 , and vertically from 0 to ± 240 .
- Black triangle time icon — Clicking and dragging this icon is a quick shortcut to setting the current time. You will most likely use this technique to set the time. See the Set Time command of the Animation menu for more detailed information about setting the time.
- Time: 00:00.00 — Shows the current time. When creating animations, the objects' state is dependant upon the current time. Clicking on this displays the Set Time dialog box to precisely set the current time. See the Set Time command of the Animation menu for more detailed information.
- Two hollow triangle icons — Clicking on these icons changes the current time by going to the previous or next frame. See the Set Time command of the Animation menu for more detailed information.
- Selected: 0 — Shows the amount of objects that are currently selected. Clicking on the word "Selected" displays a dialog box to further select objects by their name.

Image Area

The Image occupies the remainder of the World window and shows the objects. Objects are created and manipulated with the tools. See the Tools Window for information about the tools.

The image's background color can be changed by selecting a color from the palette and choosing Set Background Color from the Image menu.

Standard Objects

At the bottom of the image is a gray grid. This is the *Ground* object and it plays an important role when aligning objects. The Ground is one of the standard objects that every world has. The other standard objects are purposely hidden from view, but can be described briefly here:

- **Anchor** — Used for positioning objects just as the Ground is used for aligning objects. The Anchor looks like a blue cross.
- **Camera Main** — The camera you are presently looking through; it can be animated.
- **Camera Front, Right, Top, and Diagonal** — These cameras are special editing cameras that cannot be animated but are useful for looking at other objects from different angles.
- **Ambient** — A light that illuminates all objects in the world, providing a base light.
- **Directional** — A light which shines in one particular direction with a constant intensity.

Except for the Ground, the standard objects are hidden. To unhide the objects, see the discussion for the Groups window. (The standard objects have been placed in hidden groups so that the objects will not visually clutter the world.)

None of the standard objects can be deleted, except for the Directional light, which can be deleted.

Timeline Window

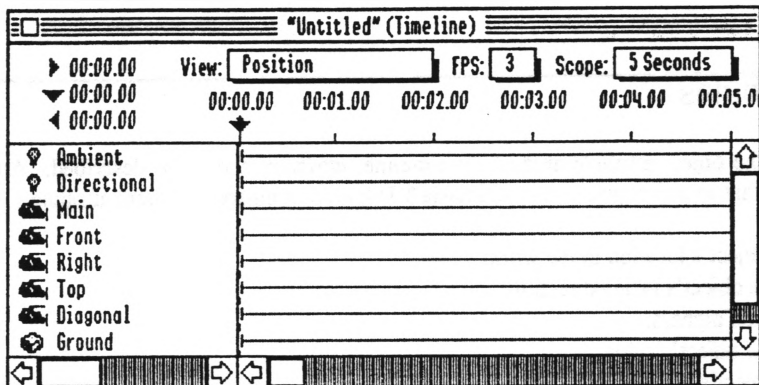
This section describes the Timeline window.

Time

Before discussing the Timeline window, the notion of *time* should be mentioned. Time is a measurement of when things occur. With Animasia 3-D, it is displayed as 00:00.00, where the format is *minutes : seconds . frames*. A time that looks like 02:45.02 would read: two minutes, forty-five seconds, and two frames. The frame part of the time is a fraction of a second. You determine how many frames per second (FPS) you want to animate—from one to thirty frames per second.

Timeline Window

The Timeline window displays events over time. The events, or *object attributes*, can be edited to occur at different times. Object attributes are explained below.



The Timeline window contains several different areas that provide different kinds of information.

Object Name Area



The box of names at the lower left side of the timeline contains the objects' names. Every object has a name and those names are displayed here. Double-clicking on a name displays the name in a dialog box to be edited. If an object's name is indented from the name above it, the indented name is a linked child to the object above it. The box of names has a scroll bar underneath so that long names, or names that are deeply indented, can be fully seen. The vertical scroll bar at the right side of the Timeline window scrolls more object names into view.

Attributes

Kinds of Attributes

Before discussing the object attribute area of the timeline, *attributes* should be described. Attributes are the different properties that an object possesses. Animasia 3-D knows of thirteen different attributes:

- Position — The object's location in the world.
- Orientation — The object's facing direction.
- Size — The object's bigness.
- Body Color — The object's color.
- Visible — The object's visibility.
- Light Intensity — A light object's illumination power.
- Field of View — The amount of the world that a camera object will see. Also, the amount of the world a spotlight object will illuminate.

The remaining attributes determine how an object will appear when the Display as Solids mode is used and the Shading option is enabled. These are called *material* attributes. These are considered more advanced attributes and can be ignored if desired.

- Ambient Reflection — Amount of the Ambient light the object will reflect.
- Body Reflection — Amount of the object's Body Color the object will reflect.
- Highlight Reflection — Amount of highlight the object will reflect.

- Highlight Color — The color of the object's highlight.
- Highlight Glossiness — The shininess of the object.
- Opacity — The transparency of the object. This is not currently used by Animasia 3-D but is included for future compatibility.

The first four attributes will be the ones you will most likely work with. The next three will be used less often, and the remaining material attributes will be the least used.

Attributes and Time

Every attribute exists at a certain time. Objects can have more than one of the same kind of attribute when the attributes have different times. For example, an object can have two Body Color attributes if one is at 00:00.00 and the other is at 00:01.00.

The different kinds of attributes are independent from each other. Each kind can have attributes at times irrespective of the other kinds. For example, an object can have a Body Color attribute at 00:00.00 and a Position attribute at 00:00.00 and the attributes won't interfere with each other.

An object can have an unlimited amount of attributes.

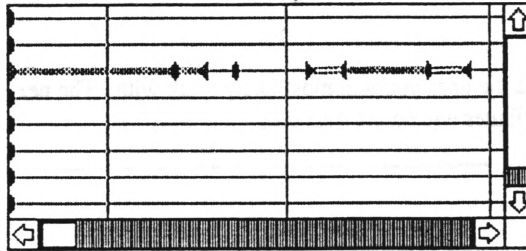
What Do Attributes Do?

Attributes, when spread over time, are the things that cause an object to be animated. When an object has more than one of the same kind of attribute, then that attribute animates. For example, an object with two Body Color attributes will animate its color.

Where Do Attributes Come From? How Are They Made?

Every new object begins with all thirteen kinds of attributes. That is, when you create, say, an oval with the Oval tool, the oval object will have a complete set of thirteen attributes. The attributes will be set to the current time. Additional attributes are automatically created when an object is modified at a different time with one of the tools. For example, changing the time and then rotating the oval object using the Rotate tool will create a new Orientation attribute at the new time. Or changing the time and then clicking on a palette color will create a new Body Color attribute at the new time.

Attribute Area



The focal part of the Timeline window is the attribute area. It is the large box occupying the bottom, middle portion of the window. It has gray horizontal lines corresponding to the object names at the left of the timeline. Every object name has its own gray line. The gray lines act like rails upon which attributes appear and can be moved. The attributes look like markers. An attribute is shown at a certain point in time, which is the central idea of the timeline. Clicking and dragging an attribute changes when in time the attribute will affect the object. Above the attribute area are times showing the progression of time along the timeline. If a marker is under the 00:00.00 time, then the marker is at zero seconds in time. If a marker is under the 00:02.01 time, then the marker is at two seconds and one frame in time. An attribute will only affect the object if the current time is at, or past, the attribute's time. (If the current time is before any attributes, then the first attribute affects the object.) The horizontal scroll bar underneath the attribute area scrolls more or less time into view.




Attribute Markers


An attribute can appear as one of five different kinds of markers, depending upon the attribute's role in the animation. The terms attribute and marker are used interchangeably.

Markers either are related to *tweening* or are not related to *tweening*. Tween is short for in-between. It means that a new attribute does not have to be created for every frame of the animation. Rather, the beginning and ending attributes are created and Animasia 3-D will automatically calculate all the middle, or in-between, attributes automatically.



- The Rest marker indicates that the attribute does not animate in-betweens to the previous or next attribute. —|—
- The Start Tween marker indicates that the attribute begins to animate in-betweens to the next Stop Tween marker. |>———
- The Stop Tween marker indicates that the attribute ends animating the in-betweens from the previous Start Tween marker. <———|

- The Continue marker looks like a Rest marker but comes between a Start Tween and a Stop Tween marker. The Continue marker indicates that the attribute modifies the in-betweening to take into account the attribute. 
- The Acceleration marker indicates that the in-betweening has stopped accelerating from the Start Tween marker and will in-between at an even pace. 
- The Deceleration marker indicates that the in-betweening has begun to decelerate to the Stop Tween marker. 

A blue bar appears between Start Tween and Stop Tween markers to better identify a Tween. If a Tween has Acceleration or Deceleration markers, a white line will appear on the blue bar to show that the Tween is accelerating or decelerating. 

Selecting Attributes

Selecting attributes is necessary if the attributes are to be moved to a different time on the timeline or the attributes are to be deleted. A selected attribute will have a bright green appearance.

Clicking on an attribute's marker selects the attribute. Holding down the Shift key while clicking selects multiple attributes. (If an attribute is already selected, holding down the Shift key will unselect the attribute.) Dragging a box around attributes selects a range of attributes. Clicking on a Tween's blue bar selects all of the attributes of the Tween. Clicking anywhere outside an attribute unselects all attributes. Note that you will only be able to select the kinds of attributes that are viewed. For instance, if View is set to Position, only the Position attributes can be selected. The exception to this rule is that if you hold down the Option key while dragging a box around attributes, any kind of attribute will be selected if it falls within the box.

Moving Attributes

To move attributes to a different time on the timeline, select the attributes and simply drag them. Attributes move in increments of 1/30ths of a second.

If a Rest marker is moved inside a Tween, the Rest marker becomes a Continue marker. Likewise, if a Continue marker is moved outside a Tween, it becomes a Rest marker.

If a Acceleration or a Deceleration marker is moved outside a Tween, the marker is automatically deleted. Acceleration and Deceleration markers are relevant only inside a Tween.

Choosing Undo from the Edit menu reverses any change.

Deleting Attributes

To delete unwanted attributes, select the attributes and choose Clear from the Edit menu or press the Delete key.

If part of a Tween is deleted, the remaining attributes of the Tween are changed to be Rest markers.

If all of the attributes of a kind are deleted, one attribute will remain. Every kind of attribute must have at least one attribute.

Changes made to objects' attributes will be reflected in the world when the World window is made frontmost.

Choosing Undo from the Edit menu reverses any deletion.

Time Markers Area



Just above the attribute area is the time marker area. The time marker area has three special, triangular markers. Note that these are not attributes, but special time indicators.

The three markers signify:

- **Current Time** — Shows the world's current time. Appears black. ▼
- **Start Time** — Shows when the animation will begin. Appears green. ►
- **Stop Time** — Shows when the animation will end. Appears red. ◀

If the time markers cannot be seen, then they are out of the scope of the timeline's attribute area. If the markers appear odd, they may be bunched together; in fact, that is how they will initially appear because they are all set to 00:00.00 (zero seconds).

A vertical line extends downward from each time marker into the attribute area. The vertical line is used to help align attributes to the time marker. If two time markers have the same time, (i.e. are right on top of each other), then their vertical lines will cancel each other out and temporarily won't be visible. This is not an error but way the lines are drawn.

Clicking and dragging a time marker changes its time. Changes made to the Current Time will only be reflected in the world when the World window is made frontmost. Choosing Undo from the Edit menu will reverse any change.

If the Start Time is set after the Stop Time then the animation will be created backwards.

Animasia 3-D has a feature that automatically sets the Stop Time while you are creating an animation. Every time a new attribute is created because of a tool's action in the World window, the Stop Time is advanced to the Current Time. This feature allows you to not worry about setting the Stop Time when creating simple animations. This feature is automatically disabled when the Stop Time is manually changed; Animasia 3-D then assumes that you know what the Stop Time should be. Once disabled, the feature cannot be re-enabled.

Time Area

00:00.00 00:01.00 00:02.00 00:03.00 00:04.00 00:05.00

The time area is just above the time markers area and simply shows time progressing along the timeline in regular intervals. It shows times in sequential order, like 00:00.00, 00:01.00, 00:02.00, 00:03.00, etc.. When the scroll bar at the bottom of the attribute area is scrolled, the times will update to coincide with the scroll bar.

Time Markers' Times Area

▶ 00:01.00
▼ 00:02.02
◀ 00:04.02

The time markers' times area simply displays the times of the time markers.

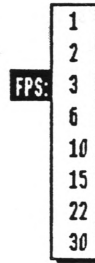
View

The View part of the timeline determines what kind of attribute will be displayed in the attribute area of the timeline. As noted before, there are thirteen different kinds of attributes, but only one kind can be displayed at a time. Clicking on the word View pops up a menu of the thirteen attributes to choose from. Forgetting to set the View properly is a common first mistake.

View:	Position
	Orientation
	Size
	Body Color
	Visible
	Light Intensity
	Field of View
	Ambient Reflection
	Body Reflection
	Highlight Reflection
	Highlight Color
	Highlight Glossiness
	Opacity

FPS (Frames Per Second)

The Frames Per Second part of the timeline determines how many frames there will be for one second. For example, if Frames Per Second is set to 3, then three frames in the animation will appear for every one second of time. Clicking on the word FPS pops up a menu of the several different Frames Per Second settings.



When creating precisely timed animations, Frames Per Second should be set to its highest setting, which is 30. Even if the animation is generated at a lower frame rate, like at six frames per second, the animation will be capable of taking advantage of the precise timing in the future.

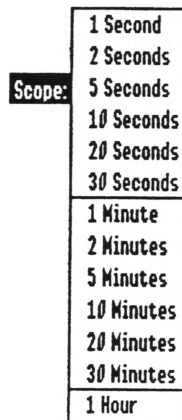
The Frames Per Second setting is directly proportional to the amount of time an animation will take to generate. Setting Frames Per Second to 30 will take ten times longer to generate an animation than setting Frames Per Second to 3.

There is a classic trade-off for animations that have high versus low frame rates. Animations with high frame rates play back smoothly with little jerkiness from motion changes. However, these same animations take up more disk and memory space and also take a long time to generate. Animations with low frame rates generate quickly, take up little disk and memory space, but appear jerky when played back. The compromise is 15 frames per second with results that are acceptable and do not overly consume disk and memory space.

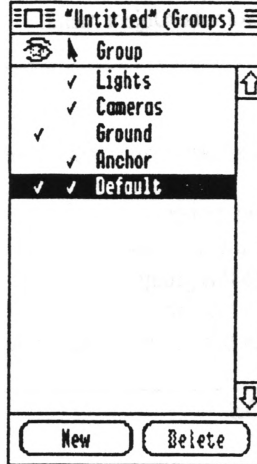
Scope

The Scope part of the timeline determines how much time will be visible in the attribute area. Clicking on the word Scope pops up a menu with thirteen different magnifications of time.

Setting the Scope to small portions of time, like 2 Seconds, is useful for detailed editing of attributes' timing while larger portions of time are useful for seeing overall attribute patterns.



Groups Window



Groups

A *group* is simply a category to which objects belong. Every object must belong to a group. The Groups window displays all of a project's groups. A project can have an unlimited amount of groups. Groups, as will be explained, are used with the World window; groups have no relation to the Timeline window.

Knowing how to use the Groups window is not necessary to create simple animations, but once many objects occupy the world, editing will be much easier if Animasia 3-D's grouping capabilities are taken advantage of.

The primary purpose of groups is to make editing tasks in the World window easier. Along these lines, groups do two things:

- Hide objects.
- Make objects unselectable.

Group Names

In the Groups window, you will see a list of names in a box under the word "Group." These are the groups. Groups can be renamed by double-clicking on the name.

The Current Group

Clicking on a group's name makes that group the current group. The current group will appear highlighted. The current group is important because selected objects in the World window can be assigned to the current group using the Put in Current Group command from the Object menu.

Standard Groups

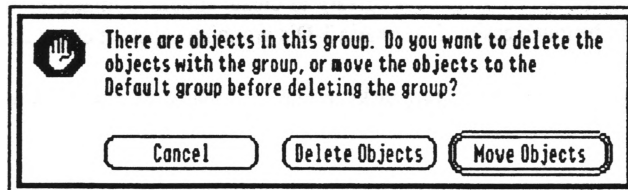
Every Groups window begins with several standard groups to manage the world's standard objects. They are:

- Lights — The world's lights belong to this group.
- Cameras — The world's cameras belong to this group.
- Ground — The world's Ground belongs to this group.
- Anchor — The world's Anchor belongs to this group.
- Default — Any new objects will be put in this group automatically.

Creating and Deleting Groups

At the bottom of the window are two buttons: New and Delete.

- Clicking on New creates a new group and makes it the current group by highlighting it. Because the group is new, no objects will belong to the group. Use the Put in Current Group command from the Object menu to assign objects to the new group.
- Clicking on Delete removes the highlighted group. The standard groups cannot be deleted—only the ones that you have created can be deleted. If a group still has objects attached to it, a dialog box will appear, asking you to decide the fate of the group's objects.



- Click Cancel to do nothing.
- Click Delete Objects to remove the objects with the group.
- Click Move Objects to first move the objects to the Default group before deleting the group.

Choosing Undo from the Edit menu will reverse any deletions.

Visibility of Objects in Groups

At the top of the Groups window is a picture of an eye. Check marks form a column under the eye. If a check mark is present, the objects in the group are visible in the World window. If there is no check mark, the objects will be hidden. Clicking on the check mark toggles it on or off. Clicking on the eye unchecks all of the groups. Command-clicking on the eye checks all of the groups.

Note: An object that is in a visible group but is not visible in the world is simply out of the camera's field of view.

Using groups to hide objects is desirable when there are many objects in the world. Hiding objects will reduce visual clutter for easier editing, and the world will take less time to recalculate when switching to different camera views.

Selectability of Objects in Groups

At the top of the Groups window is a picture of an arrow cursor. Check marks form a column under the arrow cursor. If a check mark is present, the objects in the group are selectable in the World window. If there is no check mark, the objects cannot be selected. Clicking on the check mark toggles it on or off. Clicking on the arrow cursor unchecks all of the groups. Command-clicking on the arrow cursor checks all of the groups.

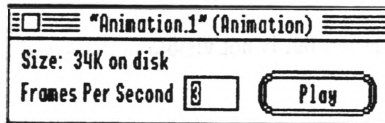
Using groups to prevent objects from being selected is desirable when an object should appear in the world but should not get in the way of the editing process. Such is the case with the Ground object; the Ground is used for aligning objects but it is not normally practical for it to be selected.

Copying Objects

When an object is copied to the Clipboard, the object's group is remembered. Subsequently pasting the object back into the world will put the pasted object into the same group from which it came. If the object is pasted into a different project's world that does not contain the same group, a new group is created with an identical name. When Animasia 3-D checks to see if a group exists, it does not care if the groups' names have different cases (i.e. the groups with names "Detail" and "detail" will match each other).

Animation Window

The Animation window represents an animation.



Play

To see the animation, click the Play button. The animation will play at the full screen size and continue to loop until stopped. While the animation is playing, pressing the left or right arrow keys slows down or speeds up the animation. A beep noise will sound if the animation cannot be played any slower or faster. Clicking the mouse or pressing any other key stops the animation and resumes Animasia 3-D's normal operations.

Looping Animations

When animations play, they loop back to the beginning to continue playing. If the animation was not completely generated, which could've happened if there was not enough disk space while generating, traces will appear in the animation after the first loop. The reason is because the final loop frame was never created. The final loop frame is responsible for correctly looping the animation back to the first frame. Animations intended for HyperStudio stacks will also exhibit this same behavior because a final loop frame should *not* be created for these animations. (The Allow Looping option in the Animate Options window should be turned off when Animating to Disk. HyperStudio will accept a final loop frame but will loop back to the beginning of the animation instead of holding at the last frame.) If there is no loop frame in an animation, the animation can certainly be played one time through, but just will not appear correctly after looping. The only way for the animation to loop correctly is to regenerate the animation from the beginning.

Frames Per Second

To change the speed at which the animation will play, type a number in the Frames Per Second box. The number's value can be in the range of 1 to 60 and indicates the amount of frames that will be played during one second. Although Animasia 3-D can play animations at 60 frames per second, Animasia 3-D can currently only generate animations with a maximum frame rate of 30 frames per second.

The Frames Per Second rate is relative to the rate at which the animation was generated. For example, if an

animation was generated at 3 frames per second, the Frames Per Second box should be set to 3 for the animation to play at its normal speed; this is the default setting. Setting Frames Per Second to 6 would play the animation at twice its normal speed. Setting Frames Per Second to 1 would play the animation at one-third its normal speed. Typically, animations that play at lower frame rates will be jerky. Likewise, an animations that play at higher frame rates will be smooth.

Setting Frames Per Second to a value over 60 will play the animation as fast as it can be played by your Apple IIGS. The animation may look streaky because it will be playing faster that the monitor can display the frames.

Size

Size indicates the size of the animation stored as a file on disk. The letter K after the number stands for kilobytes and is a measure of disk storage (and computer memory).

The animation is not held in the computer's memory all the time. Rather, the animation is stored on disk until Play is clicked. If there is not enough free computer memory for the entire animation, the animation cannot be played. Closing windows will free up memory. Restarting your Apple IIGS while immediately holding down the Shift key will free the most memory possible for Animasia 3-D's use.

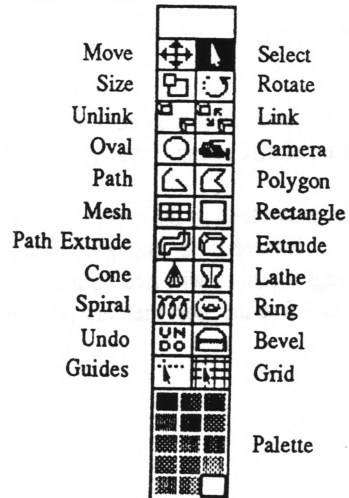
Tools Window

The Tools window contains tools and the color palette. The tools work only with the World window.

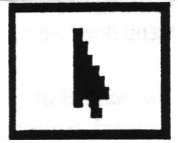
When clicked, some tools perform an immediate action, while others await for something to happen. Many tools have additional options and Command-clicking on the tool will display an options dialog box.

The Move, Rotate, and Select tools use the special modifier keys, which are: Command, Option, Control, Caps Lock, and Shift. The keys are used consistently and can be generalized:

- Command — Relates to surfaces.
- Option — Relates to points and centers.
- Control — Constrains about the third direction.
- Caps Lock — Constrains to the Ground.
- Shift — Selects many, or constrains horizontally or vertically.



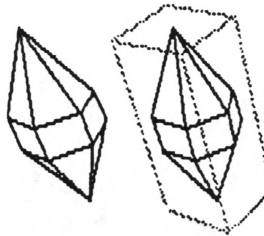
Selection Tool



Clicking on the Selection tool readies Animasia 3-D to select things. Objects, points, centers, surfaces, and paths can be selected. If the mouse is clicked and dragged, the selected items will be moved just as if the Move tool was used. See the Move tool for more details.

Selecting Objects

Click on an object to select it. A green, dotted box will surround the object, signifying that the object is selected. If the object is box-shaped, the selection will make the object appear dotted.



(An unselected and a selected object.)

To select an object that is covered by another object, repeatedly click, but do not move the mouse. Each of the overlapping objects will be selected in turn.

Clicking and dragging a box around a cluster of object selects the surrounded objects. Be careful not to catch an object by mistake when clicking because the caught object will move when you drag the mouse. If this happens, choose Undo from the Edit menu to reverse the mistake.

Holding down the Shift key selects objects in addition to the objects already selected. If the object is already selected, the object will be unselected.

All objects can be selected by choosing Select All from the edit menu.

Some objects cannot be selected by any means due to various conditions:

- Objects that are in hidden groups cannot be selected until the group is unhidden.
- Objects that are in non-selectable groups cannot be selected until the group is made selectable. See the Groups Window for more details.
- Objects that are invisible and the Show Invisible option is disabled cannot be selected until the Show Invisible option is enabled.

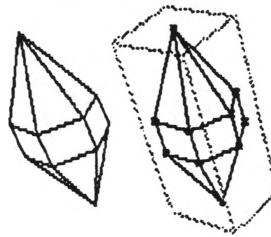
Clicking anywhere outside an object causes all objects to be unselected. Choosing Unselect All from the Edit menu does the same thing.

The number of selected objects appear at the top of the World window next to the word "Selected." Clicking on the word "Selected" displays a dialog box from which the objects can be selected by name. Choosing Select By Name from the Edit menu does the same thing.

Selecting Points

Points on an object can only be selected if the object is first selected. Select the object by clicking on it.

Hold down the Option key while clicking on an object's point to select the point. A point is the corner, or vertex, where two or more lines, or edges, meet. A small green box will appear to surround the point, signifying that the point is selected.



(The right object has all of its visible points selected.)

To select a point that is covered by another point, repeatedly click, but do not move the mouse. Each of the overlapping points will be selected in turn.

Option-clicking and dragging a box around a cluster of points selects the surrounded points. Be careful not to catch a point by mistake when clicking because the caught point will move when you drag the mouse. If this happens, choose Undo from the Edit menu to reverse the mistake.

Holding down the Shift key while clicking on a point selects the point in addition to points already selected. If the point is already selected, the point will be unselected.

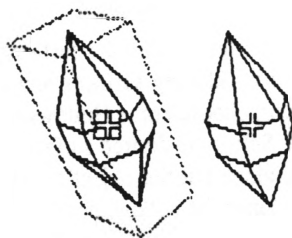
Clicking anywhere outside an object unselects all objects and therefore all points will be unselected as well. Option-clicking outside an object will just unselect all points.

Points that are hidden from view cannot be selected until the points are in view; such is the case with solid objects because solid objects will hide their backfacing surfaces and points. There is a trick to selecting any point of an object. With the object selected, choose Force Hollowness from the Appearance menu. All of the object's surfaces and points will be visible. Select the desired points. Then choose Undo from the Edit menu. The Force

Hollowness command will be undone but the object's points will still be selected. The selected points will hide because the object will no longer be hollow, but the points are still selected.

Selecting Centers

Centers are treated like points and are selected in the same way as points. An object's center looks like a plus (+) sign, and when selected, is surrounded by a green box. For centers to be visible, turn on the Centers option from the Object menu.



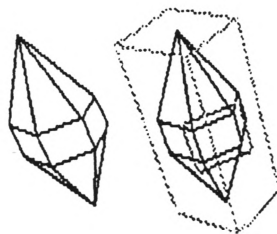
(The object's center is selected.)

Important: You should be aware of the implications of moving an object's center if the object is being animated. Read "Moving Centers" from the Move tool.

Selecting Surfaces and Paths

An object's surfaces can only be selected if the object is first selected. Select the object by clicking on it.

Hold down the Command key while clicking on an object's surface to select the surface. A surface is the flat area completely enclosed by lines, or edges. A green outline will appear to surround the surface, signifying that the surface is selected.



(The object's front surface is selected.)

To select a surface that is covered by another surface, repeatedly click, but do not move the mouse. Each of the overlapping surfaces will be selected in turn.

Command-clicking and dragging a box around a cluster of surfaces selects the surrounded surfaces. Be careful not to catch a surface by mistake when clicking because the caught surface will move when you drag the mouse. If this happens, choose Undo from the Edit menu to reverse the mistake.

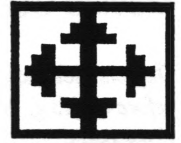
Holding down the Shift key while clicking on a surface selects the surface in addition to surfaces already selected. If the surface is already selected, the surface will be unselected.

Clicking anywhere outside an object unselects all objects and therefore all surfaces will be unselected as well. Command-clicking outside an object will just unselect all surfaces.

Surfaces that are hidden from view cannot be selected until the surfaces are in view; such is the case with solid objects because solid objects will hide their backfacing surfaces and points. There is a trick to selecting any surface of an object. With the object selected, choose Force Hollowness from the Appearance menu. All of the object's surfaces and points will be visible. Select the desired surfaces. Now choose Undo from the Edit menu. The Force Hollowness command will be undone but the object's surfaces will still be selected. The selected surfaces will hide because the object will no longer be hollow, but the surfaces are still selected.

Paths are selected in the same way as surfaces. A path looks like a long, unclosed line. A path appears green when selected.

Move Tool



Clicking on the Move tool readies Animasia 3-D to move selected objects in the World window. Click and drag the mouse to move the selected objects. Moving can be reversed by choosing Undo from the Edit menu.

Moving Objects

Whenever an object is moved, the object's Position attribute at the current time is updated. If there is no Position attribute at the current time, one is created. If an attribute is created and the Auto-Tweening option in the Animation menu is enabled, a Tween will connect the new attribute to the previous Position attribute in the Timeline window. The Tween indicates that the in-between positions will automatically be filled in across time.

Most of the standard world objects (editing cameras, Ground, and Anchor) cannot be animated and therefore will not have any new attributes created. Instead, the standard objects' single Position attribute is always updated. The only standard objects that can be animated and have new attributes are the Main camera and the lights.

Moving a parent object that has children objects linked to it automatically moves the children objects with the parent. Moving a child object moves just the child. Children that are moved with the parent do not update their Position attributes; only the parent's Position attribute is updated. (Why? Children exist relative to their parent, and any time a parent's Position, Orientation, or Size attribute changes, the child *automatically* responds relatively to the change.)

If an object moves out of the view of the current camera, the object is still selected and can be moved back into view if desired. Alternatively, the camera could be pulled back using the Move Out command from the Camera menu.

Moving the Current Camera

The current camera can be moved interactively to gain a different view of the world. For the camera to be moved, the Camera tool must be highlighted in addition to the Move tool. At least one object must be selected for the camera to move although the selected object is only used for a visual reference and does not actually move. Click and drag to rotate the camera. All the options which apply to moving objects apply to moving the camera.

Moving Points

Objects' selected points can be moved if the Option key is held down *before* clicking. (If the Option key is held down *after* clicking, the Option key has no effect on moving points but rather affects the way the object is moved by reversing a Move option.)

Moving Centers

Objects' selected centers can be moved just as if the center were a point. That is, hold down the Option key *before* clicking. Moving an object's center affects the way the object will rotate because the center is the object's pivot point.

Note: Centers won't be visible unless the Centers option in the Object menu is turned on. Centers look like plus (+) signs.

Important Note: It is necessary to be aware of the consequences of moving an object's center if the object is being animated. *The Position attribute determines the location of the object's center.* So when the center's location is changed, the object's position is effectively moved to compensate for the center's new location. The Move tool does this transparently so that the object doesn't *appear* to move, but it does. Using the Object Info command to monitor the object's Position attribute will verify these statements. When the object is being animated, you should move the center with reserve. Why? Because moving the center changes the object's Position attribute at the current time, the object will animate that change of position. The animated result is not what you will expect. If the object has any children objects, the children's positions will also be compensated so that the children will appear in the same relative position to their parent. The best way to avoid these concerns is to *only* move the center before the object is animated. That is, fully create the object, move the center if needed, and *then* animate the object across time.

Moving Surfaces

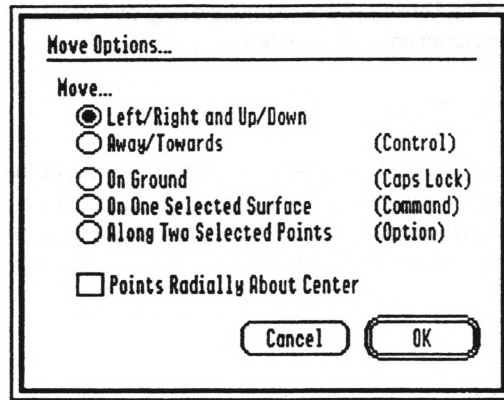
Objects' selected surfaces can be moved if the Command key is held down *before* clicking. (If the Command key is held down *after* clicking, the Command key has no effect on moving surfaces but rather affects the way the object is moved by reversing a Move option.) Moving both points and surfaces at the same time is allowed, but remember to hold down both the Option and Command keys *before* clicking.

Surface Flatness

When moving points and surfaces, there are a few things to be aware of. First, surfaces should remain as flat as possible because warped surfaces may cause the surface to be not shaded properly. A surface that is meant to have a warped shape should be converted into triangles; a triangle cannot be warped due to its simple structure. Use the Subdivide Surfaces command from the Object menu to accomplish this task. Secondly, be careful not to deform an object so that the object becomes inside-out. Inside-out objects are not allowed because they will confuse Animasia 3-D in many subtle ways. Additionally, Animasia 3-D does not know if an object is inside-out, so you will have to guard against such a case occurring.

Options

There are different options for moving objects. Command-clicking on the Move tool displays a dialog box for changing the options.



The options determine how the selected objects will be moved. An option's effect can be reversed by holding down the corresponding key in parentheses while moving objects.

- **Left/Right and Up/Down** — Objects will move in the left/right and up/down direction that the mouse moves. More specifically, the objects will move relative to the direction that the current camera faces. This option also applies to moving points, surfaces, and centers.
- **Away/Towards** — Objects will move away from or towards you when moving the mouse up or down. More specifically, the objects will move relative to the direction that the current camera faces but in an in/out motion. This option also applies to moving points, surfaces, and centers. Holding down the Control key while moving reverses the action of this option.

The next set of options constrain the way the selected objects move.

- **On Ground** — The objects will move constrained to the Ground's surface. The objects aren't actually put onto the Ground but move parallel the Ground. This feature is useful for keeping objects on the same level. This option also applies to moving points, surfaces, and centers. Depressing the Caps Lock key while moving reverses the action of this option. If the Control key is pressed so that the Away/Towards option is enabled, then the objects will move up/down, or constrained perpendicularly, from the Ground's surface.
- **On One Selected Surface** — If an object has one, and only one, selected surface, the object will move constrained in the plane of the selected surface. This option does not apply to moving points, surfaces, or centers. Holding down the Command key *after* clicking reverses the action of this option. If the Control key is pressed so that the Away/Towards option is enabled, then the objects will move up/down, or constrained perpendicularly, to the selected surface's plane. If there is not only one selected surface for

each selected object, then the object will move using the Left/Right and Up/Down option.

- Along Two Selected Points — If an object has two, and only two, selected points, the object will move constrained along the invisible line formed by the two points. This option does not apply to moving points, surfaces, or centers. Holding down the Option key *after* clicking reverses the action of this option. If there are not only two selected points for each selected object, then the object will move using the Left/Right and Up/Down option. Moving along two points works best when the mouse is moved either in a left/right *or* an up/down direction—not diagonally.

The last option is relevant only when moving points or surfaces.

- Points Radially About Center — The selected points or surfaces will move inwards and outwards from the object's center. Effectively, the points will pull in or spread out from the center's location. This option is useful for creating indentations or spikes. This option will prevent the selected points from turning inside-out. When this option is enabled and an object's center is selected, the center cannot be moved.

Rotate Tool



Clicking on the Rotate tool readies Animasia 3-D to rotate selected objects in the World window. Click and drag the mouse to rotate the selected objects. Rotation can be reversed by choosing Undo from the Edit menu.

Rotating Objects

Whenever an object is rotated, the object's Orientation attribute at the current time is updated. If there is no Orientation attribute at the current time, one is created. If an attribute is created and the Auto-Tweening option in the Animation menu is enabled, a Tween will connect the new attribute to the previous Orientation attribute in the Timeline window. The Tween indicates that the in-between orientations will be filled in across time. Orientations can only be filled in in such a way that objects will rotate one half of a circle, or 180°, from one orientation to the next. To rotate more than 180°, break up the object's complete rotation into smaller rotations, like in increments of 90°.

Most of the standard world objects (editing cameras, Ground, and Anchor) cannot be animated and therefore will not have any new attributes created. Instead, the standard objects' single Orientation attribute is always updated. The only standard objects that can be animated and have new attributes are the Main camera and the lights.

Rotating a parent object that has children objects linked to it rotates the children objects with the parent. Rotating a child object rotates just the child. Children that are rotated with the parent do not update their Orientation attributes; only the parent's Orientation attribute is updated. (Why? Children exist relative to their parent, and any time a parent's Position, Orientation, or Size attribute changes, the child *automatically* responds relatively to the change.)

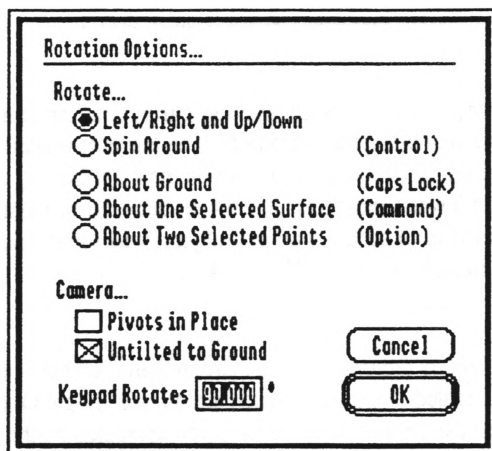
If an object rotates out of the view of the current camera, the object is still selected and can be rotated back into view if desired. Alternatively, the camera could be pulled back using the Move Out command from the Camera menu.

Rotating the Current Camera

The current camera can be rotated to gain a different view of the world. For the camera to be rotated, the Camera tool must be highlighted in addition to the Rotate tool. At least one object must be selected for the camera to rotate although the selected object is only used as a reference and does not actually rotate. Click and drag to rotate the camera. All the options which apply to rotating objects apply to rotating the camera.

Options

There are several options for rotating objects. Command-clicking on the Rotate tool displays a dialog box for changing the options.



The options determine how each selected object will be rotated. An option's effect can be reversed by holding down the corresponding key in parentheses while rotating objects.

- **Left/Right and Up/Down** — Objects will rotate in the left/right and up/down direction that the mouse moves. More specifically, the objects will rotate relative to the direction that the current camera faces.
- **Spin Around** — Objects will rotate clockwise or counterclockwise. More specifically, the objects will rotate relative to the direction that the current camera faces but in a spinning motion. Holding down the Control key while rotating objects reverses the action of this option.

The next set of options constrain the way the selected objects rotate.

- **About Ground** — The objects will rotate constrained about the up/down direction of the Ground's surface. The objects don't actually move around the Ground, but instead rotate in place. Depressing the Caps Lock key while rotating objects reverses the action of this option.
- **About One Selected Surface** — If an object has one, and only one, selected surface, the object will rotate constrained about the up/down direction of the selected surface. Holding down the Command key reverses the action of this option. If there is not only one selected surface for each selected object, then the object will rotate using the Left/Right and Up/Down option.
- **About Two Selected Points** — If an object has two, and only two, selected points, the object will rotate constrained around the invisible line formed by the two points. Holding down the Option key reverses the action of this option. If there are not only two selected points for each selected object, then the

object will rotate using the Left/Right and Up/Down option. Rotating about two points works best when the mouse is moved either in a left/right *or* an up/down direction—not diagonally.

The next two options are relevant only when the current camera is being rotated.

- **Pivots in Place** — The camera will turn in its place. The camera can be constrained with the About Ground option to turn around the Ground's up/down direction. Normally, the Pivots in Place option is turned off because the alternative is more useful. When this option is turned off, the camera will rotate around the selected objects; the camera will move *and* rotate. This is a quick way to gain a different vantage point over the selected objects.
- **Untilted to Ground** — When the camera is being rotated, the camera will stay upright relative to the Ground's surface. If this option is turned off, the camera can and will begin to tip to the side depending upon the way the camera is rotated.

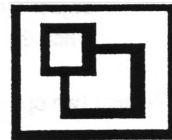
The number in the Keypad Rotates box determines how many degrees the selected objects will rotate if a number key on the keyboard's keypad is pressed. Rotation is measured in degrees, or °, where 360° equals one complete rotation. Pressing a keypad key is a quick way to rotate selected objects by an exact amount of degrees. It uses the same options and constraints as the Rotate tool. The camera can even be rotated with the keypad.

The keypad's keys of rotation are:

- 8 — Rotate up.
- 2 — Rotate down.
- 4 — Rotate left.
- 6 — Rotate right.
- 7 — Rotate counterclockwise.
- 9 — Rotate clockwise.

Note: When pressing a keypad's key, be sure not to press the Command key simultaneously because doing so would choose a camera from the Camera menu. For example, the Camera menu uses Command-2 to make the Right camera the current camera.

Size Tool



Clicking on the Size tool readies Animasia 3-D to resize selected objects in the World window. Click and drag the mouse to resize the selected objects. Sizing can be reversed by choosing Undo from the Edit menu.

Resizing Objects

Regardless of the orientation of the selected objects, clicking and dragging the mouse should be done in up/down and left/right motions. Moving the mouse right increases the width of an object, while moving the mouse left decreases the width. Likewise, moving the mouse up increases the height of the object, while moving down decreases the height. Moving the mouse diagonally up and right increases both the height and width of the object.

Advanced Note: An object can be resized along its width, height, and/or depth. Because an object's width, height, and depth directions are fixed when the object is initially created, the object cannot be resized in any other single direction, like diagonally. However, the object can be made to change where its width, height, and depth directions align themselves by using the Fix command from the Object menu.

Whenever an object is resized, the object's Size attribute at the current time is updated. If there is no Size attribute at the current time, one is created. If an attribute is created and the Auto-Tweening option in the Animation menu is enabled, a Tween will connect the new attribute to the previous Size attribute in the Timeline window. The Tween indicates that the in-between sizes will be filled in across time.

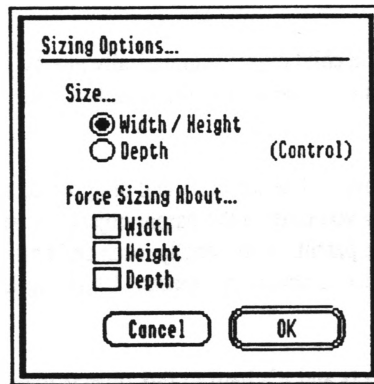
Most of the standard world objects (editing cameras, Ground, and Anchor) cannot be animated and therefore will not have any new attributes created. Instead, the standard objects' single Size attribute is always updated. The only standard objects that can be animated and have new attributes are the Main camera and the lights. Size is not an attribute normally needed by cameras or lights.

Resizing a parent object that has children objects linked to it resizes the children objects with the parent. Resizing a child object resizes just the child. (Why? Children exist relative to their parent, and any time a parent's Position, Orientation, or Size attribute changes, the child *automatically* responds relatively to the change.) Unlike the Move and Rotate tools, resizing a parent *and* a child will update the Size attribute of both. This is possible because sizing just the parent in a particular direction may not make the child resize in the same expected direction. The reason is that the child sizes along the same *inherent* direction as the parent. If the inherent directions of both objects are in line, then only the parent needs to be resized in order to make the child resize as expected with the parent. The three inherent directions of an object are determined at the time the object is created. In other words, if the child doesn't seem to size in the desired way with the parent, select both the parent and the child and then resize both.

If an object resizes out of the view of the current camera, the object is still selected and can be resized back into view if desired. Alternatively, the camera could be pulled back using the Move Out command from the Camera menu.

Options

There are several options for sizing objects. Command-clicking on the Size tool displays a dialog box for changing the options.



The options determine how the selected objects will be resized. The first two options relate to the movements of the mouse.

- **Width / Height** — The object will resize about its width and/or height when the mouse is moved left/right and up/down.
- **Depth** — The object will resize about its depth when the mouse is moved up/down. Holding down the Control key while sizing reverses the setting of this option.

The next three options force the objects to be resized about a certain direction any time the mouse moves.

- **Width** — The object's width will always resize regardless of the direction the mouse is moved.
- **Height** — The object's height will always resize regardless of the direction the mouse is moved.
- **Depth** — The object's depth will always resize regardless of the direction the mouse is moved.

If all three options are turned on, the object will resize equally in all directions; the object stays in proportion.

Advanced Note: With the *Size tool*, the height, width, and depth directions are relative to the current camera's view. With the *Size attribute*, the height, width, and depth directions are fixed at the time the object was initially created. The *Size tool* converts between the two types automatically and you shouldn't have to worry about the difference unless you plan to manually change the *Size attribute* with the Object menu's Info command.

Link Tool



Clicking on the Link tool readies Animasia 3-D to link objects to other objects to form parent-child relationships. The Link tool is useful for creating jointed models, like the arms and legs of a person.

When an object is linked to another, the child object automatically moves, rotates, and resizes whenever the parent moves, rotates, and resizes. The child exists *relative* to the parent. On the other hand, if the child moves, rotates, or resizes, the parent is not affected.

To create a link, click on the object that will be the child and drag the cursor to the object that will be the parent. A green line will follow the cursor as you drag to the parent object. A parent can have an unlimited amount of children, but a child can only have one parent. Additionally, each child can be a parent to other objects, which can result in long parent-child-grandchild-etc. chains of objects. Choosing Undo from the Edit menu reverses the linking.

If the world is too crowded with objects and it's hard to link objects together, there is an alternative method for linking objects. Command-clicking on the Link tool displays a dialog box of object names. Choose the name of the child that is to be linked. Click OK. Another list will appear. Choose the name of the parent that is to be linked. Click OK. The child will be linked to the parent.

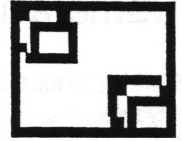
Circular relationships are not allowed. For example, linking a child to a parent and then trying to link the parent back to the child is not allowed.

The current camera is not allowed to be part of a parent-child relationship. However, a light can be linked to an object to stay with the object as the object moves, rotates, or resizes.

Animation Tip: An animated object that is to be copied and reused in the same or another world should have a master parent object that is not animated. This master parent object acts as a base from which the animated object will animate. Moving the master parent, or base, automatically moves the entire animated object with the master.

Advanced Note: When a child object is linked to a parent, all of the child's Position, Orientation, and Size attributes across time are adjusted. Since the child will no longer exist in absolute terms, the child's attributes must be made to be relative instead of absolute. If the child is not animated, meaning that the child's attributes aren't spread across time, little needs to be changed. If the child is animated, then the Link tool adjusts each attribute across time to the parent at the current time; the child will animate based upon the parent's attributes at the current time. If the child shifts slightly after linking, it is due to the adjustments.

Unlink Tool



Click on the Unlink tool to unlink all selected objects that are linked to another object. If the selected objects have no parent objects, then nothing will happen. Choosing Undo from the Edit menu reverses the unlinking.

If the world is crowded with objects, there is an alternate way to unlink. Command-clicking on the Unlink tool displays a dialog box of object names. Choose the objects that are to be unlinked and click OK.

Advanced Note: When a child object is unlinked from its parent, all of the child's Position, Orientation, and Size attributes across time are adjusted. Since the child will no longer exist relative to the parent, the child's attributes must be made to be absolute instead of relative. If the child is not animated, meaning that the child's attributes aren't spread across time, little needs to be changed. If the child is animated, then the Unlink tool adjusts each attribute across time from the parent at the current time; the child will animate based upon the time the child was unlinked from the parent at the current time. If the child shifts slightly after unlinking, it is due to the adjustments.

Camera Tool



Clicking on the Camera tool readies Animasia 3-D to affect the current camera and ignore any selected objects. The current camera can only be affected if the Rotate or Move tool is highlighted in addition to the Camera tool. (The Selection tool can act like the Move tool; the Size tool is not relevant with cameras.)

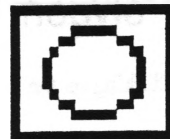
- If the Rotate tool is highlighted and used, the current camera will rotate in place or around the selected objects; the action depends upon the Rotate tool's options.
- If the Move tool is highlighted and used, the current camera will move.

In either case, at least one object must be selected for the camera to rotate or move although the selected object is only used as a reference and does not actually rotate or move.

It is often desirable to view the objects in the world from different vantage points. Using the Rotate tool in conjunction with the Camera tool will accomplish this task. Tip: From the Rotate tool's options, turn off Pivots in Place and turn on Untilted to Ground for best results when rotating around objects. The distance to the selected object(s) determines how far the camera will position itself when it rotates around the objects.

When the camera needs to be moved to a different vantage point, using the Move tool in conjunction with the Camera tool will accomplish this task. Tip: From the Move tool's options, turn on the Away/Towards option to move the camera in or out interactively.

Oval Tool



Clicking on the Oval tool readies Animasia 3-D to create flat ovals, or circle, objects.

To create an oval, click and drag the mouse in the World window. Hold down the Shift key while dragging to constrain the oval into a perfect circle. Release the mouse button when the oval is at the desired size. Choosing Undo from the Edit menu will remove the oval.

The oval object is placed at a distance from the current camera equal to the distance of the Anchor to the camera. The oval object's color is the highlighted color in the color palette.

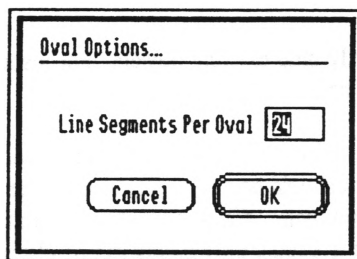
The oval object is assigned to the Default group of the Groups window. If the Default group is hidden, the oval object will immediately hide after it has been created. If this happens, open the Groups window and click under the eye icon for the Default group; the objects in the group will then be visible.

The oval shape created by the Oval tool is not a true oval, but one made up of many small lines. The advantage of using small lines is that the points connecting the lines can be selected and moved to deform the oval shape. See the Selection and Move tools.

The oval shape can be used by other tools, like Extrude, Path Extrude, Cone, Lathe, Ring, or Spiral to create interesting, 3-D shapes.

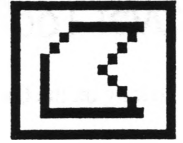
Options

Command-clicking on the Oval tool displays a dialog box for setting the Oval tool's options.



The Line Segments Per Oval box determines how many lines make up the oval. The more line segments, the smoother the oval appears, the longer it takes to calculate and draw. Ovals with few line segments won't appear to be ovals at all. For instance, an oval with five line segments is actually a pentagon.

Polygon Tool



Clicking on the Polygon tool readies Animasia 3-D to create free-form, flat objects.

To create a polygon, click and release the mouse in the World window to start the shape. A line will follow the cursor. Click and release the mouse to create more points for the polygon. Hold down the Shift key to constrain the line horizontally or vertically. To finish creating the polygon, either press the Return key, click on the first point, or click in the same location as the last created point. Choosing Undo from the Edit menu will remove the polygon.

Polygons can have an unlimited number of points. The only restriction regarding polygons, or any other closed shape, is that the shape cannot cross itself.

The polygon object is placed at a distance from the current camera equal to the distance of the Anchor to the camera. The polygon's color is the highlighted color in the color palette.

The polygon object is assigned to the Default group of the Groups window. If the Default group is hidden, the polygon object will immediately hide after it has been created. If this happens, open the Groups window and click under the eye icon for the Default group; the objects in the group will then be visible.

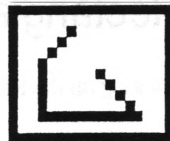
The polygon object can also be used by other tools, like Extrude, Path Extrude, Cone, Lathe, Ring, or Spiral to create other interesting, 3-D shapes.

Patch Polygons

The Polygon tool can add polygons directly onto existing objects. For instance, if an object has a hole in it, a new polygon could be created to patch the hole.

To create patch polygons, first select the object that is to be patched. Next, hold down the Option key while clicking on a point of the object. The point should be on the perimeter of the hole. Continue Option-clicking on additional points until the polygon is complete. Click on the first point or press Return to complete the polygon. Note that once a patch polygon is begun, only points can be clicked on to add to the patch polygon. Choosing Undo from the Edit menu will reverse the addition.

Path Tool



Clicking on the Path tool readies Animasia 3-D to create path objects. Path objects are used exclusively by the Path Extrude tool.

To create a path, click and release the mouse in the World window to start the path. A line will follow the cursor. Click and release the mouse to create more points along the path. Hold down the Shift key to constrain the path horizontally or vertically. To finish creating the path, either press the Return key or click in the same location as the last point. Choosing Undo from the Edit menu will remove the path.

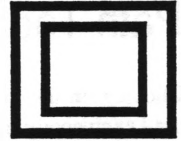
A path can have an unlimited amount of points, and unlike surfaces, it can intersect itself.

The path object is placed at a distance from the current camera equal to the distance of the Anchor to the camera. The path's color is the highlighted color in the color palette.

The path object is assigned to the Default group of the Groups window. If the Default group is hidden, the path object will immediately hide after it has been created. If this happens, open the Groups window and click under the eye icon for the Default group; the objects in the group will then be visible.

A path object can be used the Path Extrude tool to create 3-D shapes that follow the path's shape.

Rectangle Tool



Clicking on the Rectangle tool readies Animasia 3-D to create rectangles.

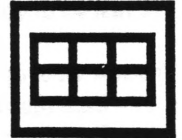
To create a rectangle, click and drag the mouse in the World window. Hold down the Shift key while dragging to constrain the rectangle into a perfect square. Release the mouse button when the rectangle is at the desired size. Choosing Undo from the Edit menu will remove the rectangle.

The rectangle object is placed at a distance from the current camera equal to the distance of the Anchor to the camera. The rectangle's color is the highlighted color in the color palette.

The rectangle object is assigned to the Default group of the Groups window. If the Default group is hidden, the rectangle object will immediately hide after it has been created. If this happens, open the Groups window and click under the eye icon for the Default group; the objects in the group will then be visible.

The rectangle shape can also be used by other tools, like Extrude, Path Extrude, Cone, Lathe, Ring, or Spiral to create other interesting, 3-D shapes.

Mesh Tool



Clicking on the Mesh tool readies Animasia 3-D to create a network, or mesh, of squares.

To create a mesh, click and drag the mouse in the World window. Hold down the Shift key while dragging to constrain the box into a perfect square. Release the mouse button when the square is at the desired size. The square determines the size of one square of the mesh. The options determine the number of squares in the mesh. Choosing Undo from the Edit menu will remove the mesh.

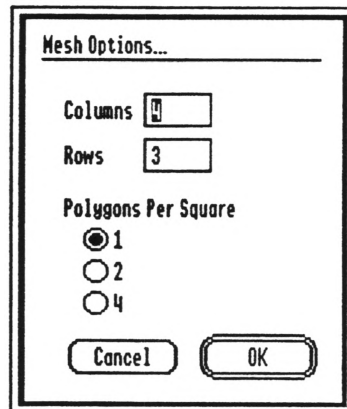
The mesh shape can be used by other tools, like Extrude or Cone to create interesting, 3-D shapes. The points of the mesh can also be moved and warped with the Move tool.

The mesh object is placed at a distance from the current camera equal to the distance of the Anchor to the camera. The mesh's color is the highlighted color in the color palette.

The mesh object is assigned to the Default group of the Groups window. If the Default group is hidden, the mesh object will immediately hide after it has been created. If this happens, open the Groups window and click under the eye icon for the Default group; the objects in the group will then be visible.

Options

Command-clicking on the Mesh tool displays a dialog box of options.

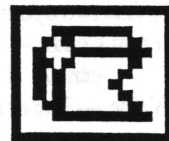


The first set of options, Columns and Rows, determine how many squares will compose the mesh.

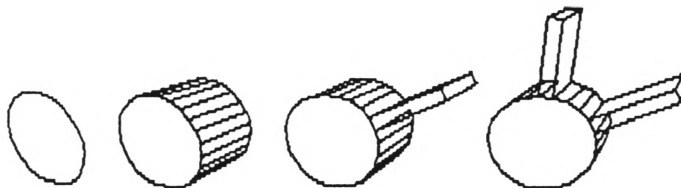
The next set of options, Polygons Per Square, determine how many smaller polygons make up one square.

- 1 — Each square will be just one square.
- 2 — Each square will be composed of two triangles.
- 4 — Each square will be composed of four triangles.

Extrude Tool



Click the Extrude tool to extrude, or extend, the selected surfaces. If a selected object has only one surface, then that surface will be extruded regardless if it's selected or not. If a selected object has more than one surface, then each desired surface must be selected to be extruded. Choosing Undo from the Edit menu reverses the action.



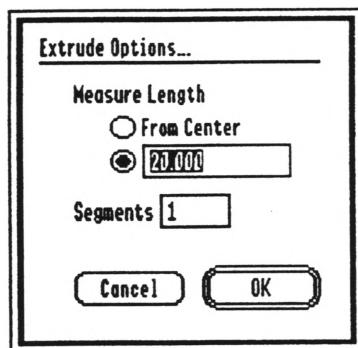
(The oval is progressively extruded.)

If the extrusion doesn't appear to work, it may be because the extruded part appears on the far side of the object. Use the Rotate tool to turn the object around.

Extrusion is a modeling function and cannot be animated. That is, you cannot animate the object extruding itself because there is no attribute relating to extrusion.

Options

There are a several options which determine how a surface is extruded. Command-clicking on the Extrude tool displays the Extrude Options dialog box.



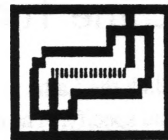
The first two options determine how far the selected surface will extrude itself.

- **From Center** — The length of the extrusion is measured as the distance between the surface and the object's center. If the center is on the surface and the distance is zero, the value in the box is used.
- **Value** — The exact length of the extrusion is measured in this box.

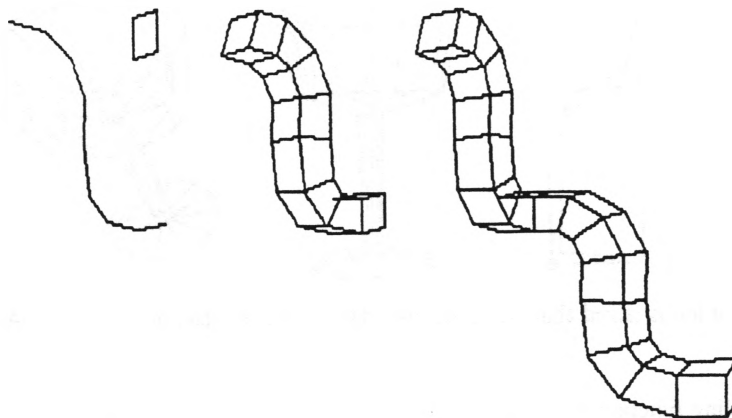
The last option relates to the way the extrusion is constructed.

- **Segments** — The number determines how many parts, or segments, will comprise the extruded length.

Path Extrude Tool



Click the Path Extrude tool to extrude, or extend, the selected surfaces along one selected path. The result is a pipe-like shape. If a selected object has only one surface, then that surface will be extruded regardless if it's selected or not. If a selected object has more than one surface, then each desired surface must be selected to be extruded. Only one path can be used to determine the way the surface will be extruded. Choosing Undo from the Edit menu reverses the action.

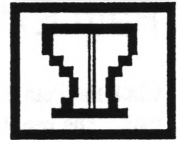


(Using the path at the left, the rectangle object is progressively path extruded.)

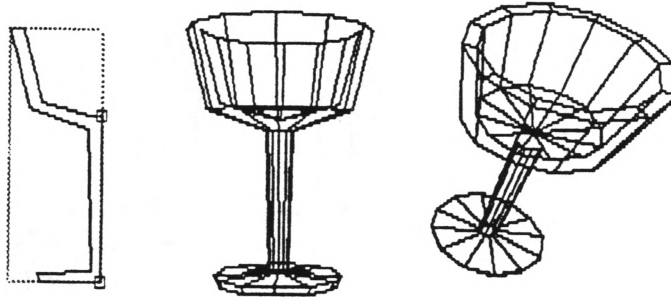
Normally, a surface will extrude itself along the path beginning with the first point on the path. The first point on the path was determined when the path was created. To force the surface to extrude itself starting from a certain end of the path, select one of the path's two end points.

If the path's first line segment doesn't line up with the direction that a selected surface faces, the path will be fitted so that it does line up.

Lathe Tool



Click the Lathe tool to lathe, or sweep, the selected object's single surface around an edge you specify. The edge's two points are selected. In other words, two consecutive points on the surface's perimeter must be selected. The two chosen points determine the center axis of the lathed shape. The result is a solid, round, symmetrical shape. The object to be lathed must only have one surface for the Lathe tool to work. Choosing Undo from the Edit menu reverses the action.

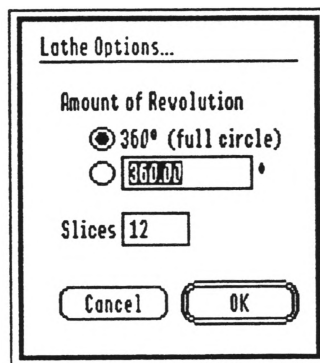


(The polygon at left is lathed about its rightmost edge to form a goblet in the middle. At right is the goblet rotated.)

Lathe is a modeling function and cannot be animated. That is, you cannot animate the object lathing itself because there is no attribute relating to lathing.

Options

There are several options which determine how a surface is lathed. Command-clicking on the Lathe tool displays the Lathe Options dialog box.



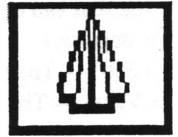
The first two options determine the amount of revolution the surface will sweep around. Revolution is measured in degrees, or $^{\circ}$, where 360° equals one circular revolution.

- 360° — The surface will sweep one full circle.
- Value — The surface will sweep the amount of revolution you specify. For instance, 180 would sweep half a circle.

The last option relates to the way the lathed shape is constructed.

- Slices — The number determines how many parts, or segments, will comprise the lathed shape.

Cone Tool



Click the Cone tool to form a cone out of the selected surfaces. The result is a pointed shape. If a selected object has only one surface, then that surface will be coned regardless if it's selected or not. If a selected object has more than one surface, then each desired surface must be selected to be coned. Choosing Undo from the Edit menu reverses the action.



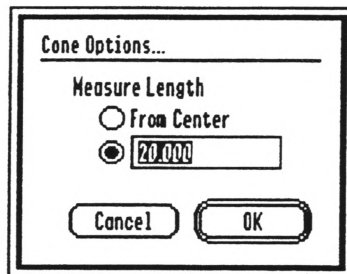
(The rectangle is progressively coned.)

If the coning doesn't appear to work, it may be because the cone appears on the far side of the object. Use the Rotate tool to turn the object around.

Cone is a modeling function and cannot be animated. That is, you cannot animate the object coning itself because there is no attribute relating to coning.

Options

There are several options which determine how a surface is coned. Command-clicking on the Cone tool displays the Cone Options dialog box.



The first two options determine how far the selected surface will cone itself.

- From Center — The length of the cone is measured as the distance between the surface and the object's center.
If the center is on the surface and the distance is zero, the value in the box is used.
- Value — The exact length of the cone is measured in this box.

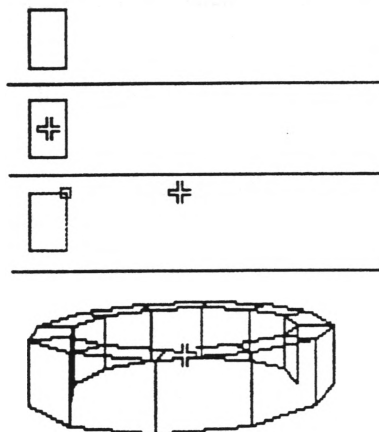
Ring Tool



Click the Ring tool to create a ring out of the selected object's single surface you specify. The selected object can only have one surface for the Ring tool to work.

To use the Ring tool, several steps need to be followed.

- Step 1. The radius of the resulting ring must be specified. The radius is half the width of the ring. From the Object menu, turn on the Centers option because the centers need to be visible. The object's center is used to specify the radius.
- Step 2. Select the object and then the object's center, the +, by Option-clicking on it.
- Step 3. Move the center outside the object by Option-dragging the center. (If the center will not move, check the Move tool's Move Options so that the Points Move Radially option is disabled.)
- Step 4. Select one point on the surface by Option-clicking on the point. The distance between the center and the one selected point determines half the width, or radius, of the ring.
- Step 5. Click on the Ring tool to create the ring. Choosing Undo from the Edit menu reverses the action.

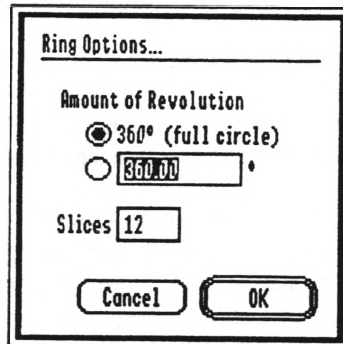


(The rectangle is ringed.)

Ring is a modeling function and cannot be animated. That is, you cannot animate the object ringing itself because there is no attribute relating to ringing.

Options

There are several options which determine how a surface is ringed. Command-clicking on the Ring tool displays the Ring Options dialog box.



The first two options determine the amount of revolution the surface will sweep around. Revolution is measured in degrees, or °, where 360° equals one circular revolution.

- 360° — The surface will sweep one full circle, or a complete ring.
- Value — The surface will sweep the amount of revolution you specify. For instance, 180 would sweep the surface one-half a complete revolution, or half a ring.

The last option relates to the way the ringed shape is constructed.

- Slices — The number determines how many parts, or segments, will comprise the ringed shape.

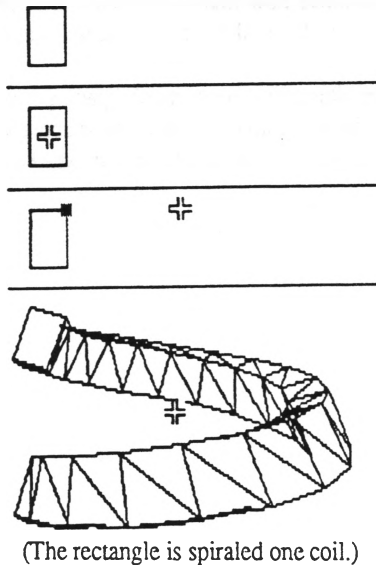
Spiral Tool



Click the Spiral tool to twist, or spiral, the selected object's single surface into a corkscrew shape. The selected object can only have one surface for the Spiral tool to work.

To use the Spiral tool, several steps need to be followed.

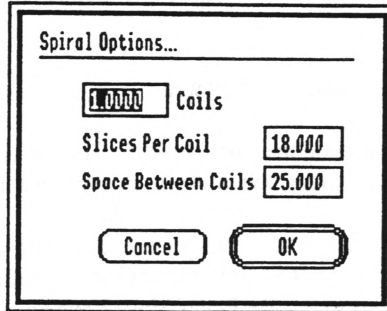
- Step 1. The radius of the resulting spiral must be specified. The radius is half the width of the spiral. From the Object menu, turn on the Centers option because the centers need to be visible. The object's center is used to specify the radius.
- Step 2. Select the object and then the object's center, the +, by Option-clicking on it.
- Step 3. Move the center outside the object by Option-dragging the center. (If the center will not move, check the Move tool's Move Options so that the Points Move Radially option is disabled.)
- Step 4. Select one point on the surface by Option-clicking on the point. The distance between the center and the one selected point determines half the width, or radius, of the spiral.
- Step 5. Click on the Spiral tool to create the spiral. Choosing Undo from the Edit menu reverses the action.



Spiral is a modeling function and cannot be animated. That is, you cannot animate the object spiraling itself because there is no attribute relating to spiraling.

Options

There are several options which determine how a surface is spiraled. Command-clicking on the Spiral tool displays the Spiral Options dialog box.

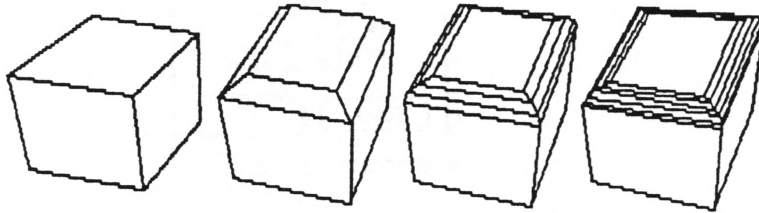


- **Coils** — The number determines the amount of coils in the resulting spiral. Spirals can easily become large and take minutes to create if this is set to a value greater than 10.
- **Slices Per Coil** — The number determines how many segments, or slices, will occur in one coil. A large number of slices will create a smooth spiral but the spiral will consume more memory and take longer for Animasia 3-D to recalculate.
- **Space Between Coils** — The number determines how much spacing there will be between each coil of the spiral. If the resulting spiral is bunched together, then the spacing was too small. If the resulting spiral is too elongated, the the spacing was too large. Space is measured in abstract units, but can be thought of as inches.

Bevel Tool



Click the Bevel tool to extrude, or extend, the selected surfaces and to taper the edges. This tool works like the Extrude tool but the extruded surface is rounded. If a selected object has only one surface, then that surface will be bevelled regardless if it's selected or not. If a selected object has more than one surface, then each desired surface must be selected to be bevelled. Choosing Undo from the Edit menu reverses the action.



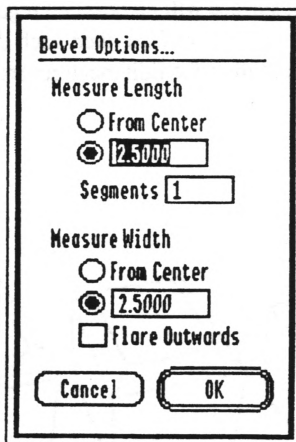
(A cube has its top surface bevelled with one, three, and five segments.)

If the beveling doesn't appear to work, it may be because the bevelled part appears on the far side of the object. Use the Rotate tool to turn the object around.

Bevel is a modeling function and cannot be animated. That is, you cannot animate the object beveling itself because there is no attribute relating to beveling.

Options

There are several options which determine how a surface is bevelled. Command-clicking on the Bevel tool displays the Bevel Options dialog box.



The first two options determine how far the selected surface will extrude itself.

- **From Center** — The length of the extrusion is measured as the distance between the surface and the object's center. If the center is on the surface and the distance is zero, the value in the box is used.
- **Value** — The exact length of the extrusion is measured in this box.

The next option relates to the way the extrusion is constructed.

- **Segments** — Determines how many parts, or segments, will comprise the extruded length. The more segments, the rounder the bevel. If Segments is set to 5, the bevel will have a smooth, rounded construction. If Segments is set to 1, the bevel will have a sharp, chiseled construction.

The next two options determine how far inward the selected surface will bevel itself.

- **From Center** — The width of the bevel is measured as the distance between the object's center and the surface's point closest to the center. The measurement is not precise, but it is visually close.
- **Value** — The exact width of the bevel is measured in this box.

The last option relates to the way the bevel is constructed.

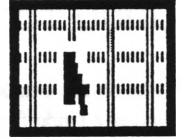
- **Flare Outwards** — If this option is turned on, the bevel will push outwards instead of bevel inwards. The effect is umbrella-like.

Undo Tool

Click on the Undo tool to reverse the result of the last action. This does the same thing as choosing Undo from the Edit menu.



Grid Tool



Clicking on the Grid tool toggles whether or not the cursor will align itself to an invisible grid. The grid spacing is set as an option.

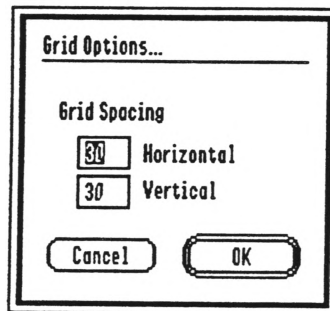
Gridding is used when creating new objects and therefore will be evident when the Oval, Polygon, Path, Rectangle, or Mesh tools are highlighted.

If the Move, Rotate, or Size tools are highlighted, the tool's actions will respond as if the cursor is moving on an invisible grid.

- Moving an object will move the object in increments of the grid spacing.
- Rotating an object will rotate the object by degrees of the grid spacing.
- Sizing an object will resize by increments of the grid spacing.

Options

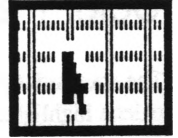
There are options for setting the grid spacing. Command-clicking on the Grid tool displays the Grid Options dialog box.



- Horizontal — Number of horizontal pixels per grid space.
- Vertical — Number of vertical pixels per grid space.

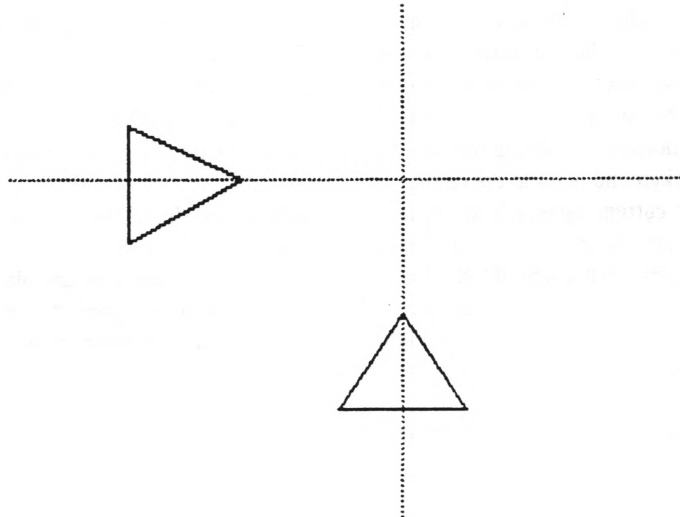
Despite the Apple IIGS's 640 x 200 pixel screen size, Animasia 3-D pretends that the screen size is 640 x 480 pixels, which results in a square pixels.

Guides Tool



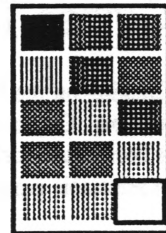
Clicking on the Guides tool toggles whether or not guides will appear in the World window. Guides are horizontal and vertical dotted green lines that appear when the cursor is horizontally or vertically aligned with an object's point in the image. Objects must be in selectable groups for the guides to appear.

Guides are used when creating new objects and therefore will only be visible when the Oval, Polygon, Path, Rectangle, or Mesh tools are highlighted. Guides will also appear when moving points.



Color Palette

The standard Apple IIGS colors are displayed in the palette. Clicking on a color in the palette highlights the color and changes the color of an item. The item is determined by the options described below.



Depending upon the key that is being held down when clicking on a color, the color is applied to a different thing.

- **None** — The selected objects are set to the color. Specifically, the Body Color attribute of the objects are changed to the new color. If an object doesn't have a Body Color attribute at the current time, a new one is created. If an attribute is created and the Auto-Tweening option in the Animation menu is enabled, a Tween will connect the new attribute to the previous Body Color attribute in the Timeline window. The Tween indicates that the in-between colors will be filled in across time.
- **Command** — The selected surfaces of the selected objects are set to the color. For the color of the surfaces to be seen, the Surface Coloring option in the Appearance menu must be enabled for the particular object. (If the option is off, a dialog box will ask if the Surface Coloring option should be turned on.)
- **Shift** — The background is set to the color.
- **Control** — The current camera is set to the color, which is useful if the camera is actually a light, like a spotlight, and the color of the light needs to be changed.
- **Option** — The previously highlighted color and the currently selected color are blended in a 50/50 ratio and applied to the item. Even if the blended color does not make a perfect match to one of the palette's colors, the closest color will be highlighted and the blended color remembered. The blended color can be re-blended with another color to further mix the color.

New objects are created with the highlighted color.

Menu Reference

The following section describes all of the menus and menu commands used by Animasia 3-D. The menus are:

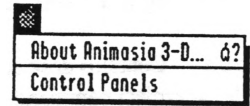
- Apple — Contains desk accessories.
- File — Project commands.
- Edit — Clipboard and object selection commands.
- Windows — Window names.
- Object — General object commands.
- Appearance — Object appearance commands.
- Align — Object aligning commands.
- Camera — Camera commands.
- Image — Image commands.
- Animation — Object animation commands.

Menu commands that work with objects require that at least one object is selected. If there are no selected objects, most menu commands will display a dialog box to choose objects by name. If there are selected objects, holding down the Control key will make the same dialog box appear so as to further choose other objects. The dialog box also contains a Help button that briefly describes the function of the menu command.

Menu commands that appear *italicized* indicate that the command can animate the selected objects if the time has changed.

The reference is organized by menus and menu commands.

Apple Menu



The Apple menu contains the standard About command and all desk accessories.

About Animasia 3-D

shortcut: Command-?

Choose About Animasia 3-D from the Apple menu to display the version number and copyright information.

File Menu

File		
New		⌘N
Open...		⌘O
Close		⌘W
Save		⌘S
Save As...		
Revert to Saved		
Import DXF...		
Export Image...		
Page Setup...		
Print...		⌘P
Quit		⌘Q

The File menu contains commands relating to files, or projects. Use this menu to create, open, save, and print your projects. This menu is also used to import objects from other 3-D applications.

New

Shortcut: Command-N

Choose New from the File menu to create a new project. The World window of the project will be displayed. The other two windows, Timeline and Groups, are hidden until they are needed. Available memory is the only limit to the number of open projects.

Projects

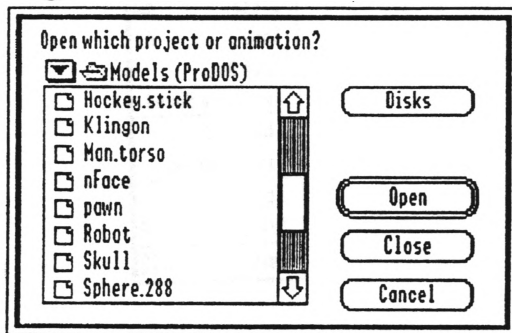
A project is composed of three related windows: World, Timeline, and Groups. The World window is where you create, edit, and view your 3-D objects. The Timeline is where you view and modify the 3-D objects' attributes. The Groups window allows related 3-D objects to be collected into *groups* for easier management.

Every time a new project is created, there will be the three new windows. Only the World window is initially visible. The Timeline and Groups windows are hidden until needed. In fact, you don't need to use the Timeline and Groups windows if you don't want to; the Timeline and Groups windows are not necessary to use Animasia 3-D, although they help tremendously with your animation efforts. For more information on the three windows of a project, see the About the Windows section of the manual for more detailed information on the windows.

Open

Shortcut: Command-O

Choose Open from the File menu to select and open an existing project or animation on disk. You will be presented with the standard Open dialog box to find and highlight the file you want to open. Available memory is the only limit to the number of open projects or animations.

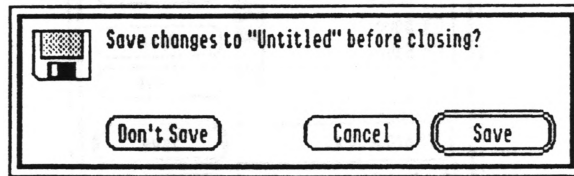


Close

Shortcut: Command-W

Choose Close from the File menu to close the frontmost window. Animasia 3-D has four types of windows and each behaves differently when closed:

- An Animation window will simply be closed.
- A Timeline window will be hidden, but not closed.
- A Groups window will be hidden, but not closed.
- A World window will close the project, which includes closing the Timeline and Groups windows associated with the project. If the project has been changed, a dialog box will ask if you want to save the project.



Click Don't Save to discard all of the changes you've made.

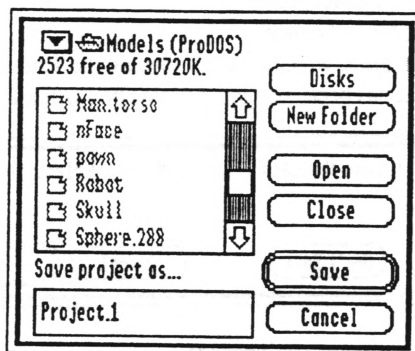
Click Cancel if you chose to Close by mistake.

Click Save to save the changes and then close the project.

Save

Shortcut: Command-S

Choose Save from the File menu to save the changes made to the current project as a file on disk. If the project had not been previously saved, the standard Save dialog box will appear asking you to specify a name and a location on disk for the saved project.



Save As

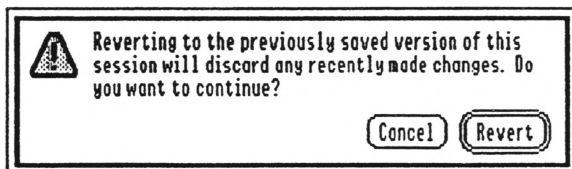
Choose **Save As** from the **File** menu to save a copy of the current project under a different name.

The original project will be in the same state in which it was last saved. The newly saved project will be the one currently displayed. To access the original project, you will have to re-open it.

Revert to Saved

Choose Revert to Saved to restore the current project to the state at which it was last saved to disk. This option will be dimmed if no changes have been made to the project or the project was previously saved.

A dialog box will ask you if you want to continue with this action.

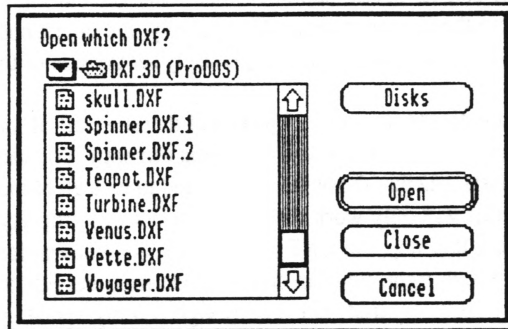


Click Revert if you want to revert to the project's previously saved state.

Click Cancel if you chose Revert to Saved by accident.

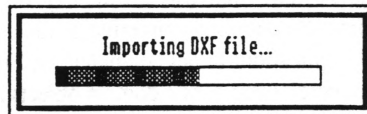
Import DXF

Choose Import DXF from the File menu to add 2-D and 3-D objects created by other applications to the current project. A standard Open dialog box will ask you to choose a DXF-type file to import.



Note: Currently, Animasia 3-D will list all files that have a signature of text, binary, or "unknown." It is up to you to correctly choose a file that ends with the letters "DXF."

Once Open is clicked, the importing process will immediately begin and a window will appear informing you of the progress.



Note: DXF files take awhile to process into a format that Animasia 3-D can understand. Please be patient. For DXF files that are 100K in size, you can expect to wait three minutes using an accelerated IIGS. If the process is taking too long, you may cancel by pressing the ESC key, or the Command and Period keys together.

When the importing process is complete, a beep will sound. All other objects will be unselected and the DXF object will be displayed and selected. The name of the DXF object is its file name.

DXF Objects

The DXF object will be in the 3-D world location in which the original application saved the DXF object. Therefore, it may be out of view of the current camera. There are two things that can be done to see the DXF object:

- 1) Choose Point at Objects from the Camera menu to aim the current camera at the object. This won't be much help if the DXF object is too close to the camera, the object is too big, or if the camera lies inside the object.

2) Align the Front, Right, Top, and Diagonal editing cameras to view the DXF object by choosing Align Editing Cameras from the Align menu. Then choose one of the Front, Right, Top, and Diagonal cameras from the Camera menu. All four of these cameras will move out to a safe distance and point themselves at the object.

If the DXF object is so small that its detail cannot be made out, the current camera can be moved in closer choosing Move Current In from the Camera menu. Alternatively, the object could be resized to be larger using the Size tool. Choosing Size from the Align menu can precisely set the size of the object.

Tip: Most DXF objects are not closed, or solid, objects and therefore all of its surfaces will be displayed. (A closed/solid object will display only the surfaces which face the camera.) You can choose Force Solidity from the Appearance menu to tell Animasia 3-D that the object is solid and to hide all of the surfaces which face away from the camera's view. Note that this will only work if the DXF object was properly formed by its host application. For example, if, after performing this step, the DXF object looks like it has surfaces hidden from the side closest to the camera, or it just doesn't look right, you can choose Undo from the Edit menu to set it back to the way it was. Choosing Force Solidity isn't required, but it does significantly speed up the display in the Display as Solids mode because Animasia 3-D does not have to calculate, shade, and draw surfaces which will be obscured by other surfaces of the object.

DXF Files

DXF stands for "Drawing Interchange Format" and was created by AutoDesk for their popular AutoCAD application. The format has now become the common denominator for exchanging 2-D and 3-D objects with differing applications; virtually all 3-D applications on all computers will read or write this format. As a result, you can tap into the huge volume of commercial and public domain objects stored in this DXF format.

The quality of DXF objects varies tremendously. Some of the best DXF objects are those created using a 3-D digitizer. A 3-D digitizer can duplicate real world objects that would be impossible to create with traditional 3-D tools in applications like Animasia 3-D. The down side to these digitized objects is that they must be created manually and take many hours to do so—even for relatively simple objects. Thus their cost is usually greater than \$100, although many of these objects do exist in the public domain; some of these public domain objects are included with Animasia 3-D.

DXF objects can be either 2-D or 3-D. 2-D objects are flat and may or may not suit your needs. There is no way to tell beforehand if an DXF file contains 2-D or 3-D objects except by guessing from the name of the file. Usually, 2-D objects will have been created by Computer Aided Drawing (CAD) programs and consist mostly of simple lines, not 3-D surfaces.

Note: Currently, Animasia 3-D can only display objects made of lines, or paths, in the Display as Lines mode, not the Display as Solids mode.

Note: Currently, Animasia 3-D will only read the DXF format; there is no corresponding export command.

Note: DXF files are ordinary text files and can be opened, viewed, and edited with any simple word processor. You will see words and lots of numbers in DXF files.

Technical Note: DXF files are made up of small parts called entities. Currently, Animasia 3-D only supports these entities:

3DFACE, SOLID, TRACE (a three- or four-sided surface)

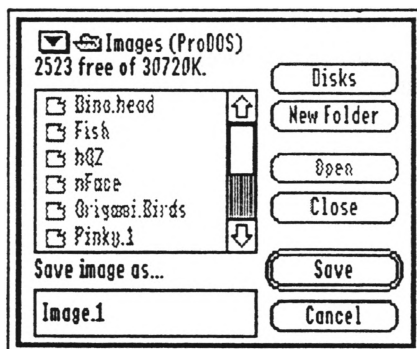
3DLINE, LINE (a one-segmented path)

POLYLINE (a multiple-segmented path)

POINT

Export Image

Choose Export Image from the File menu to save the current project's image to disk. A standard "Save" dialog box will ask you for the name and location of the image's file.



The image, almost exactly as it is displayed, will be saved in the universal Apple IIGS *Apple Preferred Format (APF)*. This format can be viewed by virtually all productivity applications for the Apple IIGS, like Platinum Paint, HyperStudio, GraphicWriter III, and AppleWorks GS, to name a few. Object selections, names, and centers will not be saved with the image—they exist separately from the image.

Page Setup

Choose Page Setup from the File menu to set the paper size for printing. The standard Page Setup dialog box will appear and its appearance will depend upon the current printer in use.

To change the current printer, use the Control Panels desk accessory, found under the Apple menu. From the list of icons, select and click Open for either “DC Printer” or “Net Printer.” From there, you will see the current printer highlighted. If you cannot find the desired printer, you will have to install an appropriate printer onto your start-up disk with the Installer application that comes with System Software 6.0.1. If the desired printer driver is not on the Installer disk, you may have to purchase a set of printer drivers elsewhere.

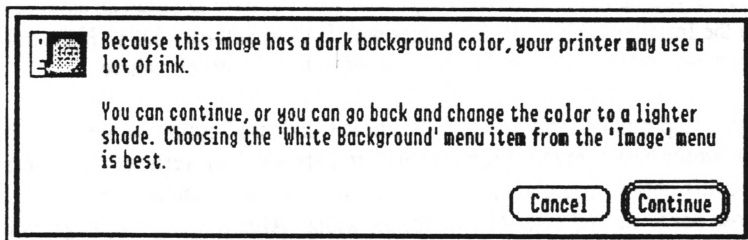
Note: If the Page Setup dialog window has a “Vertical Condense” option, it would be best *not* to select it. Unlike text, which works best with this option enabled, images will look verically squashed if this option is set. If you need to use this option, you can perform a trick to make the image appear normal on paper: From the Image menu, choose Set Scale and enter 41.66% for the width. After printing the image, you can reset the width back to 100%.

Print

Shortcut: Command-P

Choose Print from the File menu to print the image of the current project.

If the background of the image is dark or black, a dialog box will inform you that this image will use a lot of printer ink. Making the background white may look better when printed.



The standard Print dialog box will then ask you for various options. The exact appearance of this dialog will depend upon the current printer in use. See Page Setup for an explanation on how to change the current printer.

The image, almost exactly as it is displayed, will be printed. Object selections, names, and centers will not be printed with the image—they exist separately from the image.

Note: To cancel the printing process, press the Command and Period keys together.

Quit

Shortcut: Command-Q

Choose Quit from the File menu to quit Animasia 3-D and return to the previous application. If there are any unsaved projects, you will be individually prompted whether or not each should be saved.

Edit Menu

Edit	
Undo Move	⌘Z
Cut	⌘X
Copy	⌘C
Paste	⌘V
Clear	
Select by Name...	
Select All	⌘A
Select All Children	
Select All in Current Group	
Unselect All	
Show Clipboard	

The Edit menu contains commands for using the Clipboard, selecting objects in the World window, and selecting attributes in the Timeline window.

The Clipboard is a temporary holding area for pictures, text, sound, and 3-D objects. These types of information are placed into the Clipboard and then put back in other applications or desk accessories. The Clipboard will always contain what was last cut or copied. Animasia 3-D works with only pictures and 3-D objects that are in the Clipboard, ignoring anything else.

The Edit menu commands work with the current selection, which may be:

- World window - One or more objects selected with the Select tool or the Select commands.
- Timeline window - One or more object attributes selected with the Select tool.

Undo

Shortcut: Command-Z, or clicking the UNDO tool icon

Choose Undo from the Edit menu to undo the last change made to the current project. There are thirty levels of undoable changes, which allows you to experiment freely with thirty different actions, and if you later decide that the result is not what you wanted, you can keep choosing Undo until you come back to the original state.

Note: Every time a change is made, the previous state is remembered by Undo. Making certain changes to objects with many surfaces will use up a lot of memory. These changes include:

- Deleting objects.
- Deleting points or surfaces from an object.
- Deforming points or surfaces of an object.
- Using the Extrude, Cone, Lathe, Ring, Spiral, Path Extrude, and Bevel tools.
- Subdividing surfaces.
- Converting surfaces to paths.
- Converting paths to surfaces.

Actions which change an object's attribute, like its position or orientation, use little memory.

Tip: If your Apple IIGS is running low on memory, try saving a project, closing it, and then re-opening the project. This will cause the memory used by Undo to be released for further use.

Cut

Shortcut: Command-X

Choose Cut from the Edit menu to remove the selected objects from the World window and to place them into the Clipboard. When an object is cut, the object's attributes are cut along with the object's shape.

To cut an entire hierarchy of objects, be sure to select all objects in the hierarchy. An easy way to do this is to select the root object and then choose "Select All Children" from the Edit menu. Note: For all children to be successfully selected, they cannot be in a hidden or unselectable group.

Cut objects remember their group for subsequent pastes. See the Paste command.

Portions of an object can be cut out so that only the selected portion is placed in the Clipboard. A portion of an object is any selected points or surfaces. A point that is selected will automatically include any surface which shares the point. Cutting out portions is useful for extracting parts of a complex object to result in smaller, separate objects. Such is the case with imported DXF objects that often have parts that should be smaller, separate objects.

To cut out a portion of an object, follow these steps:

Step 1. Select the points or surfaces to be cut.

Step 2. If there are selected points, hold down the Option key. If there are selected surfaces, hold down the Command key.

Step 3. Choose Cut from the Edit menu.

A hole is created where the selected portion once was located. An object with a hole will no longer be solid and therefore will appear hollow.

Note: Currently, cut portions of an object will *appear* as the entire object in the Clipboard window.

Copy

Shortcut: Command-C

Choose Copy from the Edit menu to copy the selected objects and to place them into the Clipboard. When an object is copied, the object's attributes are copied along with the object's shape.

To copy an entire hierarchy of objects, be sure to select all objects in the hierarchy. An easy way to do this is to select the root object and then choose "Select All Children" from the Edit menu. Note: For all children to be successfully selected, they cannot be in a hidden or unselectable group.

Copied objects remember their group for subsequent Pastes. See the Paste command.

Portions of an object can be copied so that only the selected portion is placed in the Clipboard. A portion of an object is any selected points or surfaces. A point that is selected will automatically include any surface which shares the point. Copying portions is useful for extracting parts of a complex object to result in smaller, separate objects. Such is the case with imported DXF objects that often have parts that should be smaller, separate objects.

To copy a portion of an object, follow these steps:

Step 1. Select the points or surfaces to be copied.

Step 2. If there are selected points, hold down the Option key. If there are selected surfaces, hold down the Command key.

Step 3. Choose Copy from the Edit menu.

Note: Currently, copied portions of an object will *appear* as the entire object in the Clipboard window.

Paste

Shortcut: Command-V

Choose Paste from the Edit menu to place the contents of the Clipboard into the current World window. The contents of the Clipboard determine what can be pasted. Animasia 3-D currently supports pasting only 3-D objects.

After pasting, all other objects will be unselected and the pasted object or objects will be selected.

A pasted object will retain its attributes along with its shape. The attributes will not be changed, although the time of the attributes will be shifted to begin at the current time. For example, an object that was created at time 00:00.00, copied, and then pasted at 00:01.00 will begin animating at time 00:01.00. These results can be verified by looking at the Timeline window and choosing the appropriate attributes to view.

If nothing appears to happen after choosing Paste, be sure to check that the pasted object isn't right on top of the original object. This can happen if an object is copied and then immediately pasted back into the world. Because the pasted object is selected, it can be moved using the Move tool.

Cut or copied objects remember their group. Pasting an object back into the same world will put the pasted object in the same group from which the object came. If the group does not exist anymore because it was deleted, a new group of the same name will be created for the object. Likewise, if an object is pasted into a different world that does not have the same group as the object, a new group of the same name will be created for the object. If an object is pasted into a world and the object does not appear, be sure to check that the object's group is not hidden by inspecting the Groups window.

Pasting a partially cut or copied object will paste just the portion of the object that was selected. The object will in all ways be like the original object except that pasted object will be a portion of the original object.

Clear

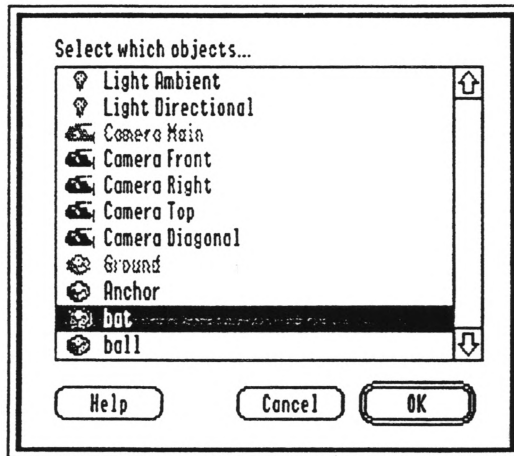
Shortcut: Delete

Choose Clear from the Edit menu to remove the selected objects from the World window, or remove the selected attributes from the Timeline window.

Select By Name

Shortcut: Clicking on the word “Selected” in the World window

Choose Select By Name from the Edit menu to select objects by their name. A dialog box will ask which objects are to be selected.



Multiple objects can be selected two ways:

- **Individually** — Hold down the Command key and click on the objects' names.
- **In ranges** — Click on the first name, hold down the Shift key, and then click on the last object name of the range.

Objects that are dimmed cannot be selected for any one of these reasons:

- Most likely, the object is in a hidden group.
- The object's visible attribute is set to invisible *and* the Show Invisible option is turned off.
- The object is the current camera.

Select All

Shortcut: Command-A

Choose Select All from the Edit menu to select all objects in the World window, or all object attributes in the Timeline window.

In the Timeline window, all object attributes will be selected, regardless of the current kind of attribute that is being viewed.

Objects that cannot be selected are due to any one of these reasons:

- Most likely, the object is in a hidden group.
- The object's visible attribute is set to invisible *and* the Show Invisible option is turned off.
- The object is the current camera.

Select All Children

Choose Select All Children from the Edit menu to select the children and grandchildren objects of all selected objects. Child objects are objects that have been linked to another object with the Link tool.

Children objects that cannot be selected are due to any one of these reasons:

- Most likely, the child object is in a hidden group.
- The child object's visible attribute is set to invisible *and* the Show Invisible option is turned off.

Select All in Current Group

Choose **Select All in Current Group** from the **Edit** menu to select only the objects that are in the currently highlighted group in the **Groups** window. The previously selected objects are not unselected.

For this menu item to be choosable, these conditions must be met:

- The **Groups** window is *open* somewhere on the desktop; it doesn't have to be frontmost.
- Within the **Groups** window, one of the groups must be highlighted to be made current.
- The highlighted, current group must be visible *and* selectable (a check mark must appear under the eye *and* arrow icons).

Objects that cannot be selected are due to any one of these reasons:

- The object's visible attribute is set to invisible *and* the **Show Invisible** option is turned off.
- The object is the current camera.

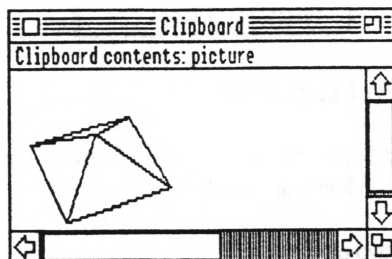
Unselect All

Choose Unselect All from the Edit menu to unselect all objects in the World window, or unselect all object attributes in the Timeline window.

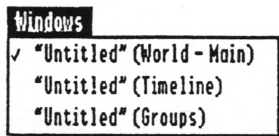
While clicking outside an object with the Select tool will always unselect all objects, sometimes the camera is positioned so close to an object that the object will occupy the entire window. Choosing Unselect All can help in this situation.

Show Clipboard

Choose Show Clipboard from the Edit menu to open the Clipboard's window and display its contents. The Clipboard will contain whatever was last cut or copied.



Windows Menu



The Windows menu contains the titles of all the windows on the desktop.

Choose a window's title from the Windows menu to bring the window to the front of all other windows. A check mark appears next to the title of the window that is frontmost.

The title of a window is divided into two parts:

- The part in "quotes" is the file name.
- The part in (parentheses) is the type of window.

See the About the Windows section for a description of the different window types.

Object Menu

Object	
Info...	⌘I
Centers	
Recenter	⌘R
Names	
Rename...	⌘N
Put in Current Group	⌘G
Subdivide Surfaces	
Convert Surfaces to Paths	
Convert Paths to Surfaces	
Flip...	
Fix	
Fuse	
Add Lights...	
Create Highlight	

The Object menu contains various commands which work with the currently selected objects. There is also a command to add new lights.

Info

Shortcut: Command-I

Choose Info from the Object menu to change the selected objects' attributes for the current time and view other miscellaneous information. This feature is an advanced feature and is not necessary to use Animasia 3-D in normal situations.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Object Info for Ground			
Position	0.0000	0.0000	0.0000
Orientation	0.0000	0.0000	0.0000
Size	100.00	100.00	100.00
Body Color	46.666	46.666	46.666
Visible	<input checked="" type="checkbox"/>		
Field of View	46.007	*	
Ambient Reflection	50.000	%	
Body Reflection	100.00	%	
Highlight Reflection	50.000	%	
Highlight Glossiness	5.0000		
Highlight Color	100.00	100.00	100.00
Light Intensity	1.0000	Distance	
Opacity	100.00	%	

Kind: Model

Group: Ground

Points: 36 Edges: 60

Surfaces: 25 Attributes: 13

Parent: (none)

Children: 0

Inherit Orientation from Orientation: Yes

Inherit Position from Orientation: Yes

Inherit Position from Size: Yes

Inherit Size from Size: Yes

Shape Is Solid: No

Forced Solid: No

Forced Hollow: No

Previous

Next

Revert

Done

The Object Info dialog box shows one object at a time. At the top of the dialog box is the name of the object currently being viewed.

The left side of the dialog box contains the object's attributes for the current time, while the right side contains statistics that cannot be changed from this dialog box.

If more than one object was selected, clicking the Previous and Next buttons allow you to go back or advance to other objects.

Click the Done button to update any changes that were made to the object attributes. If you later decide the changes were not what you wanted, you can choose Undo from the Edit menu.

Click the Revert button to restore the object's attribute values to their original state. Clicking on the Previous or Next buttons will update the values' original state.

Object Attributes

The object's attributes are displayed for the current time. That is, the values in the dialog box correspond to the markers in the Timeline window at the current time.

Values

The values can be in the range of +32767.9999 to -32767.9999. Decimal values are significant to four digits (0.0001 will be recognized, but 0.00001 won't). Upon later examination, an entered number may appear slightly off, like 14.9999 when 15 was entered. This is due to rounding errors and affects only the *display* of the number. Animasia 3-D only displays the five most significant digits, even if more digits are in the number; the digits aren't lost, they just aren't displayed. This is to reduce visual confusion. For a number like 10000.0001, the .0001 is insignificant to the 10000 and can be safely not displayed, although Animasia 3-D still knows the whole number.

Position — These three values are the object's location in the world. The center of the world is at 0, 0, 0, which is also the location of the middle of the Ground object. The units are measured in inches, where 1.0 equals one inch, 0.5 equals a half inch, 12.0 equals one foot, etc. There is enough room in Animasia 3-D's world to hold a mile in each direction.

Orientation — These three values are the object's angle of rotation about its pitch (X), yaw (Y), and roll (Z) axes. Using your head as an example, pitch is like nodding your head "yes," yaw is like nodding your head "no," and roll is like tilting your head to the side. Angles are in units of degrees (°), where 360° equals one complete circular revolution. Positive angles are counterclockwise as viewed from the outside of the object. Angles are compounded upon each other such that the object is first rotated about its X, then Y, then Z axes; this may be hard to visualize for complex orientations, but Animasia 3-D does the hard work for you with the Rotate tool. Values entered that are larger than 360° are changed so that they do not exceed 360°. Values less than 0° are changed so that they are a positive number. If a value has to be changed by Animasia 3-D, the value is still equivalent to the unchanged value, but displayed in a range of 0 to 360° (e.g. 370° is equivalent to 10°, or 370° - 360° = 10°). New objects inherit the current camera's orientation so that the new object appears to not be rotated relative to the camera.

Size — These three values are the object's percentage (%) of its original size. Setting a value to 200% will make the object twice as large in a certain direction. Likewise, setting a value to 50% will make the object half as large. The object can be sized about its width (X), height (Y), and depth (Z) axes. If the object is rotated, the X, Y, and Z axes will be at a different orientation to the camera and may be hard to judge; Animasia 3-D does the hard work for you with the Size tool. **Tip:** To make it easier to visualize the effect of the size values, choose "Reset Orientation Facing Camera" from the Align menu to orient the object so that the X axis points left to right, the Y axis points bottom to top, and the Z axis points near to far. New objects are automatically created to orient this way.

Body Color — These three values make up the object's base color. If the object is a light, then this color is the color that the light emits. The values are percentages (%) of the overall color's red (R), green (G), and blue (B) components. Normal values range from 0 to 100%. From red, green, and blue, all other colors can be created. Red and green make yellow. Green and blue make aqua. Blue and red make purple. Setting all three to 100% makes white, setting all three to 0% makes black, and all three at 50% is middle gray. It may not be easy to visualize these combinations; Animasia 3-D does the hard work for you when you click on a color from the Tool window's color palette.

Visible — This attribute determines if the object is visible or not, which is a convenient way to hide objects when they are no longer needed in an animation. All invisible objects will be visible if the Show Invisible option in the Appearance menu is turned on.

Field of View — This value is primarily used by cameras or spotlight objects. All objects have this attribute because any object can be made the current camera with the Make Object Current command in the Camera menu. Spotlights use the field of view as their cone of light. Field of view is measured in degrees (°) and must be greater than 0° and less than 180°.

Ambient Reflection — This material attribute determines the percentage of light the object will reflect from the Ambient light. The default is to reflect 50% of the Ambient light. If this is set to 0%, then the object will receive none of the Ambient light. If this is set to 100%, the object will receive all of the Ambient light. The Ambient light affects all surfaces of an object, regardless if the surfaces face entirely away from other light sources. Reducing the amount of ambient reflection will make the object appear highly contrasted.

Body Reflection — This material attribute determines the percentage of the object's body color that is reflected. The default is 100% so that the object's color is completely reflected. Setting this to 0% would result in an object that appeared with no color, or black. However, in such a case, the object may still reflect ambient light and have a highlight, depending upon the ambient reflection and highlight reflection attributes.

Highlight Reflection — This material attribute determines the percentage of the object's highlight color that is reflected. The default is 50%. Setting this to 0% results in no highlight, while setting this to 100% results in a harsh highlight.

Highlight Glossiness — This material attribute determines the glossiness of the object's highlight. The default is 5. Unlike the other attribute values, this is not a percentage; it is an exponential factor, which means that the value doesn't have to be large to achieve its effect. For example, setting this to 1 creates a highlight with a broad, gentle fall-off. Subsequent, higher values create a highlight that is twice as sharp and focused as the previous highlight.

Highlight Color — These three values make up the object's highlight color, which is independent of the body color. The highlight color values are percentages (%) of the overall color's red (R), green (G), and blue (B) components. Normal values range from 0 to 100%. From red, green, and blue, all other colors can be created. Red and green make yellow. Green and blue make aqua. Blue and red make purple. Setting all three to 100%

makes white, setting all three to 0% makes black, and all three at 50% is middle gray. The highlight reflection attribute will affect how much of the highlight color is seen, or reflected.

Light Intensity — For light objects, this value is the light's intensity. If the object is not a light, then this value has no effect. For the Ambient and directional lights, this value is normally in a range between 0 to 100%, although it can be higher to create harsh lighting effects. For radial and spotlights, this value is the distance at which the light's rays strike objects without saturating the object or affecting the object too little; it is the distance of balanced illumination.

Opacity — This object attribute is not currently used by Animasia 3-D, but is included for future compatibility with versions that will use it. For now, the default value is 100% opaque.

Object Statistics

Kind — This indicates the kind of the object. They are Light, Camera, or Model.

Group — This indicates the group that the object belongs to. Every object must belong to a group. See the Groups window for the list of groups.

Points — This indicates the number of points, or vertices, that the object uses. The more points an object has, the longer it will take to calculate when moved, sized, or rotated.

Edges — This indicates the number of edges that the object uses. An edge is a line between two points.

Surfaces — This indicates the number of surfaces, or polygons, that the object uses. Paths are also included in this number. The more surfaces an object has, the longer it will take to shade.

Attributes — This indicates the number of attributes that the object uses. Attributes are the markers that appear in the Timeline window.

Parent — This indicates the name of the object's parent object, if any. An object can be linked to another object using the Link tool. Unlinking is performed with the Unlink tool.

Children — This indicates the total number of children and grandchildren objects that the object has linked to it.

Inherit Orientation from Orientation — This indicates if the object's orientation will follow the orientation of its parent. If the object has no parent, then this setting will be used if and when the object is linked to another object.

Inherit Position from Orientation — This indicates if the object's position will follow the orientation of its parent. If the object has no parent, then this setting will be used if and when the object is linked to another object.

Inherit Position from Size — This indicates if the object's position will follow the size of the its parent. If the object has no parent, then this setting will be used if and when the object is linked to another object.

Inherit Size from Size — This indicates if the object's size will follow the size of its parent. If the object has no parent, then this setting will be used if and when the object is linked to another object.

Shape Is Solid — This indicates if the object is a solid. A solid object is completely enclosed by its surfaces and has no holes. A hollow object is not completely enclosed by its surfaces and has a hole in it.

Forced Solid — This indicates if the object has been forced to act like it is a solid. Normally, this is set to "No." If set to "Yes," the object's surfaces that face away from the camera will be hidden instead of always displayed. When in the Display as Lines mode, this reduces visual clutter. When in the Display as Solids mode, this reduces the time it takes to calculate the image.

Forced Hollow — This indicates if the object has been forced to act like it is hollow. Normally, this is set to "No." If set to "Yes," all of the object's surfaces will be displayed, even if the surfaces face away from the camera. This allows all the points surfaces of an object to be selected.

Centers

Choose Centers from the Object menu to display or hide all of the objects' centers.

Centers look like plus (+) signs and indicate the location of an object's pivot point. Objects rotate about their center. Centers are also used with some tools, such as Ring, Spiral, Extrude, Cone, and Bevel.

Recenter

Shortcut: Command-R

Choose Recenter from the Object menu to put the center into the middle of the selected objects. Note: To better visualize where an object's center is located, turn on the Centers option from the Object menu. Centers look like plus (+) signs.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Every object has a center, or pivot point, about which the object rotates. Sometimes, after modifying an object, the pivot point is not where it should be and the object will rotate in an unexpected way. Recentering puts the center back in the middle of the object.

The center can be precisely positioned. If no points or surfaces are selected, the center is put in the exact middle of the object. If there are selected points and surfaces, the middle of these points and surfaces are used to position the center. For example, if one point is selected, the center is positioned at the selected point. If two or more points are selected, the center is positioned in the middle of the selected points. If a surface is selected, the center is positioned in the middle of the surface. If more than one surface is selected, then the average middle of the surfaces is used. If multiple points and surfaces are selected, then their average middle is used.

The center can be repositioned interactively by selecting the center with the Move tool and dragging the center to a new position.

Important Note: It is necessary to be aware of the consequences of changing an object's center if the object is being animated. *The Position attribute determines the location of the object's center.* So when the center's location is changed, the object's position is effectively moved to compensate for the center's new location. Animasia 3-D does this transparently so that the object doesn't *appear* to move, but it does. Using the Object Info command to monitor the object's Position attribute will verify these statements. When an object is animated, you should recenter the object with reserve. Why? Because recentering the object changes the object's Position attribute at the current time, the object will animate that change of position. The animated result is not what you will expect. If the object has any children objects, the children's positions will also be compensated so that the children will appear in the same relative position to their parent. The best way to avoid these concerns is to only recenter before the object is animated. That is, fully create the object, recenter it if needed, and *then* animate the object across time.

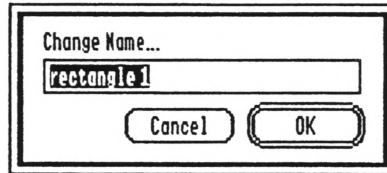
Names

Choose Names from the Object menu to display or hide all of the objects' names. Each object has a name, although it does not have to be unique. Names help identify an object.

Rename

Choose Rename from the Object menu to rename all selected objects. Object names can be up to 255 characters long.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to rename. Holding down the Control key will force the same dialog box to appear if there are selected objects.



Put in Current Group

Shortcut: Command-G

Choose Put in Current Group from the Object menu to put all selected objects into the current group. The current group is the highlighted group name in the Groups window.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

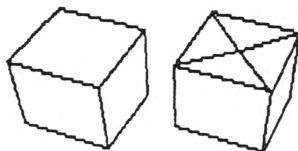
Putting an object into a group that isn't visible (no check mark under the eye icon) immediately hides the object.

Putting an object into a group that isn't selectable (no check mark under the arrow icon) immediately unselects the object.

For more information on how to use groups, see the Groups Window of the Reference manual.

Subdivide Surfaces

Choose Subdivide Surfaces from the Object menu to split selected surfaces into smaller, triangular surfaces.

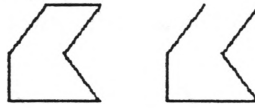


For best results, the selected surfaces should be convex shapes, or in other words, shapes that don't have indentations. This is not a strict rule because many shapes with indentations will subdivide fine, while some won't. The majority of surfaces you will work with will subdivide without any visual problems. If, after subdividing a surface, the result does not look right, the process can be reversed by using the "Undo" command in the Edit menu.

Subdividing a surface is necessary when a non-triangular surface has been deformed by moving some of its points. If a surface is warped and no longer flat, Animasia 3-D will not be able to determine the surface's correct shade. The solution is to subdivide the surface into triangles. Because a triangle cannot be warped and is always flat no matter how much its points are deformed, it is the ideal shape if you will be deforming an object that has non-triangular surfaces.

Convert Surfaces to Paths

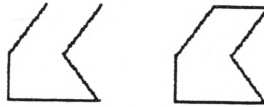
Choose Convert Surfaces to Paths from the Object menu to convert all selected surfaces to paths, or lines. Surfaces can be converted if and only if they are alone and not a part of an object with other surfaces or paths.



Converting surfaces to paths can be useful for the Path Extrude tool that uses paths. For instance, creating an oval path by hand with the Path tool is difficult, but creating oval surfaces with the Oval tool is simple. Once an oval is created with the Oval tool, Convert Surfaces to Paths can convert the oval surface into an oval path. Then the oval path can be used with the Extrude Along a Path tool for a smooth, oval extrusion.

Convert Paths to Surfaces

Choose Convert Paths to Surfaces from the Object menu to convert all selected paths to surfaces. Paths can be converted if and only if they are alone and not a part of an object with other surfaces or paths. A path must also have more than one line segment. Because paths can be any shape, it is important that the path to be converted does not crisscross itself because the resulting surface isn't allowed to do so.



Converting paths to surfaces is useful in circumstances when a DXF object is imported and its interesting shapes are paths, not surfaces. This is common with DXF files that contain outlines of text characters. Once the path is converted into a surface, it can be extruded with the Extrude tool.

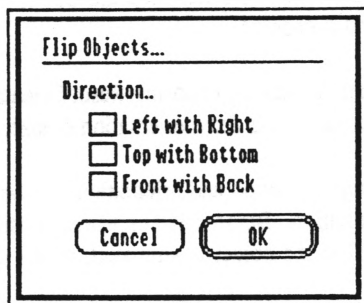
FYI: “Corel Draw” for Windows is one the few software package that can export outlines of TrueType text characters as DXF files.

Flip

Choose Flip from the Object menu to flip the selected objects about a direction. Flipping an object is useful for when a copy of an object needs to mirror the appearance of the original object.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

A dialog box will appear, asking about which directions the objects should be flipped.



- Left with Right — The objects' left and right sides will be switched.
- Top with Bottom — The objects' top and bottom sides will be switched.
- Front with Back — The objects' front and back sides will be switched.

More than one direction will be flipped at the same time if more than one option is checked.

Fix

Choose Fix from the Object menu to freeze the selected objects at their current orientation and size. In other words, the fixed objects' orientation and size will become the default orientation and size for those objects.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

The selected objects' size attribute will be set to 100%, 100%, 100% for the width, height, and depth. The orientation attribute will be set to equal the camera's orientation attributes, (which is the same result when the Reset Orientation Facing Camera command is chosen).

After fixing an object at its desired orientation and size, choosing Reset Orientation Facing Camera or Reset Size from the Align menu will return the object back to its fixed orientation or size.

If the fixed object has children, the children's position and orientation will be compensated so that the children appear to be in the same location and orientation. Because the children's position and orientation attributes will be changed, it is best to fix an object before the object is animated, or the changing of the attributes may be animated.

Fixing an object is useful in some circumstances, like when a DXF object is imported and its default orientation and size are not correct. After orientating and sizing the DXF object to its desired look, fixing the object will keep it that way.

Fuse

Choose Fuse from the Object menu to permanently add together the selected objects. The geometry, or shape, of the objects are fused together; the attributes are discarded from all but one of the selected objects.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

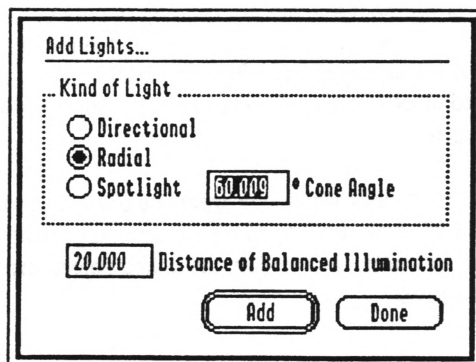
Because all selected objects will be fused into just one object, only one object's attributes will be kept while the others will be discarded. The default is for the Fuse command to use the object which has the most points as the master object. To ensure that a certain object will be the master object, turn on the Centers option in the Object menu and select the desired object's center. Select a center using the Select tool and Option-click on the center. Centers appear as plus signs (+).

Fusing objects is useful in some cases where one aggregate object is desired. However, it is often better to link objects together using the Link tool. Linking has many advantages over fusing, such as that the linked objects retain their own individual attributes. In addition, the linked objects can be easily repositioned or even deleted without affecting the parent object.

Add Lights

Choose Add Lights from the Object menu to add an unlimited number of lights to the world. Be aware that for every additional light added, the image takes a little longer to calculate when in Display as Solids mode and Shading is turned on.

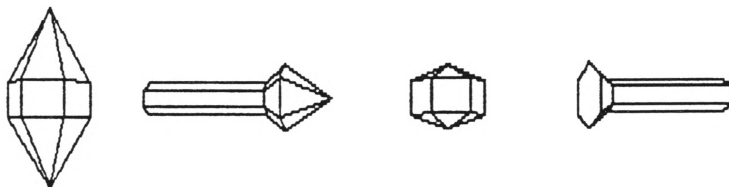
Every world has two default lights, Ambient and Directional. It is often necessary to add more lights to the world in order to produce different moods.



Kinds of Lights

There are four kinds of lights that Animasia 3-D supports:

- **Ambient** — (Not shown in dialog box) Emits the base lighting that affects all objects, even if the objects face away from all other light sources. This light ensures that all objects' surfaces will receive light. Every world contains one default ambient light; more ambient lights are not needed.
- **Directional** — Shines light in only one direction, striking objects with a constant intensity. This light mimics the effects of sunshine because the sun is so far away that its rays of light strike the earth in one direction and do not spread out.
- **Radial** — Spreads light out in all directions from one location, decreasing intensity with distance. This light mimics an unshielded light bulb.
- **Spotlight** — Shines light in one direction, but limits its influence to a cone of light. Intensity decreases with distance. This light mimics a desk lamp.



(From left to right are ambient, directional, radial, and spotlight lights.)

Click on the radio button to choose the kind of light you want to add: Directional, Radial, or Spotlight. (An ambient choice is not provided because the world already contains a default ambient light.)

If choosing Spotlight, also set the spotlight's cone of light in the "Cone Angle" box. This value is measured in degrees and must be greater than 0 and less than 180°. Note: The spotlight's cone angle is the Field of View attribute; they are just different names for each other.

The *intensity*, or strength, of the light is set with the bottom box. For directional (and ambient) lights, the strength is measured as a percentage. Radial and spotlights' intensity is measured as Distance of Balanced Illumination. This is the distance at which the light's rays strike objects without saturating the object or affecting the object too little. In other words, it is the perfect distance of the light from objects. If the light is moved closer to the objects, the objects will appear saturated with the light's color. If the light is moved further away, the objects will appear less, or not at all, affected.

Click Add to add the chosen light to the world. More than one light can be added by clicking Add multiple times. If more than one light was added, the light objects will appear in the world directly on top of each other. Use the Move tool to separate the lights. If the light objects cannot be seen, they are in the Light group, which is hidden; see below.

Light Settings

In addition to the settings in the Add Lights dialog box, each light will have other options and attributes set:

- Group — Lights are placed in the Lights group. If this group is not visible (there is no check mark under the eye icon), then the lights will not be visible.
- Color — Lights are set to white, but their color can be changed by clicking on a color in the Tool window's palette; lights emit their color.
- Position and orientation — By default, the lights face away from the camera and are placed straight out at a distance equal to the distance of the Anchor object. However, lights can be placed so that they will produce a highlight on an object's surface. This requires some prior planning. Before choosing Add Lights, select an object and select *one* surface on that object that should receive the full highlight of the added lights. All added lights will then aim themselves at the one selected surface. Because the highlight is dependent upon the position of the camera, the highlight will fall upon a different part of the object if the camera moves.

Click Done when finished. All previously selected objects will be unselected and the added lights will be selected. If you later decide that you did not want the lights, you can choose "Undo" from the Edit menu.

Create Highlight

Choose Create Highlight from the Object menu to position and orient all selected lights so that they create a highlight on a selected surface.

This command requires a short set up. Select an object and select *one* surface on the object that should receive the full highlight of the lights. Then additionally select the light or lights that will create the highlight. If a light is a radial or a spotlight, the distance from the light to the selected surface will be the light's distance of balanced illumination, or Intensity attribute. Directional lights will be the same distance from the selected object.

Because the highlight is dependent upon the position of the camera, the highlight will fall upon a different part of the object if the camera moves.

Be aware that creating a highlight moves and orients the selected lights. If the current time has changed, the moving and orienting of the lights will be animated.

Appearance Menu

Appearance
Box
Boxes Override All
Outline
Surface Coloring
Self-Illuminated
Invisible
✓ Show Invisible
Force Solidity
Force Hallowness
Inherit Orientation from Orientation
Inherit Position from Orientation
Inherit Position from Size
Inherit Size from Size

The Appearance menu allows you to change options that affect the appearance of objects.

Box

Choose Box from the Appearance menu to toggle whether or not the selected objects appear as normal models or as boxes.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Choosing to make an object appear as a box speeds up Animasia 3-D considerably because of the simplicity of a box. An object's box is always the smallest box that can enclose the object.

Boxes cannot have points or surfaces selected.

Tip: Objects with many points and surfaces take longer amounts of time to rotate and display. It is best to make these objects appear as boxes so that operations can proceed faster.

Tip: When creating an animation, it is not necessary to turn all boxed objects back into their regular models. Rather, when choosing Animate to Window or Animate to Disk, select the Objects Appear as Models option from the Animate Options dialog box. All objects will be forced to appear as models for the duration of the animation and not as boxes.

Boxes Override All

Choose Boxes Override All from the Appearance menu to toggle whether or not all objects appear as models or as boxes. Choosing to make all objects appear as boxes speeds up Animasia 3-D considerably because of the simplicity of a box. An object's box is always the smallest box that can enclose the object.

Boxes cannot have points or surfaces selected.

Tip: Worlds with many objects take longer amounts of time to update when the viewpoint changes. It is best to make all the objects appear as boxes so that operations can proceed faster.

Tip: When creating an animation, it is not necessary to turn off Boxes Override All. Rather, when choosing Animate to Window or Animate to Disk, select the Objects Appear as Models option from the Animate Options dialog box. All objects will be forced to appear as models for the duration of the animation and not as boxes.

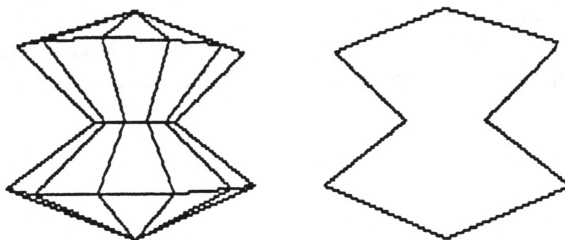
Outline

Choose Outline from the Appearance menu to toggle whether or not the selected objects will appear as an outline or as their normal appearance. An outlined object will not show its surfaces, just its outer edge.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Outlined objects cannot have points or surfaces selected.

Outlining objects can be useful to temporarily reduce an object's visual complexity when editing.



Note: Objects only appear as outlines in Display as Lines mode, not Display as Solids. In Display as Solids mode, the outlined object will appear normal.

Surface Coloring

Choose Surface Coloring from the Appearance menu to toggle whether or not a selected object will display its individual surface colors.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

An object has two options to determine how it will be colored. If the Surface Coloring option is:

- Off — An object will use its Body Color attribute to determine the color of the entire object. Body Color is an attribute and therefore the color can be animated.
- On — An object will use the individual colors of each surface to color the object. Individual colors cannot be animated, although they can add interesting detail to an object's appearance. The default color for all surfaces is white.

If the Surface Coloring option is turned on, the color of the surfaces will be most apparent in Display as Solids mode. (Turning off the Shading option helps to clearly see the exact color the surfaces.) Because the Display as Lines mode only draws lines, or edges, the color of individual surfaces may be difficult to discern if an edge is shared by two surfaces with differing colors.

To change the color of an individual surface or surfaces, select the surface by Command-clicking on it, and then Command-click on the desired color in the color palette of the Tools window.

Self-Illuminated

Choose Self-Illuminated from the Appearance menu to toggle whether or not an object will illuminate itself or not.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Self-illumination is only apparent in Display as Solids mode. A self-illuminated object will appear to be entirely its own color; it will not have any shading and will not be affected by any light.

Objects that should be self-illuminated are things that you don't want to appear shaded, like light bulbs, or the eyes of a mysterious villain. For instance, Animasia 3-D creates its lights as self-illuminated.

Invisible

Choose Invisible from the Appearance menu to toggle whether or not the selected objects should be invisible. If an object is already invisible, choosing Invisible will reverse the invisible effect, making the object visible.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Invisible objects will be visible until the Show Invisible option is turned off.

Changing invisibility changes an object's Visible attribute, which means that an object could disappear and reappear in an animation.

Objects can be hidden, or made invisible, two ways:

- Choosing Invisible. This is useful for when an object needs to appear and disappear in an animation. The Invisible option corresponds to the Visible attribute, which can be animated.
- Unchecking the visible check mark for the object's group (under the eye icon in the Groups window). This cannot be animated and is useful for editing purposes.

Show Invisible

Choose Show Invisible from the Appearance menu to toggle whether or not invisible objects will be visible.

Invisible objects pose a small dilemma, but only if you are not prepared for it. Invisible objects cannot be seen when Show Invisible is turned off. Such objects cannot be selected in any way. So how do you select the invisible objects so that you can make them visible again? The answer is to turn Show Invisible back on so that the objects will reappear. The objects can then be made visible by choosing the Invisible option again. (Choosing Invisible will reverse the invisible effect, making the invisible objects visible.)

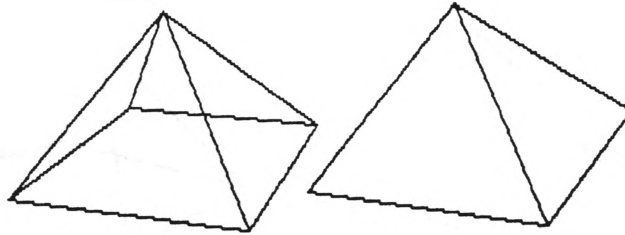
In the Display as Lines mode, invisible objects that are visible have a hatched appearance to denote that they are invisible. In the Display as Solids mode, invisible objects that are visible appear normally.

Tip: Keep Show Invisible turned on while editing, but when animating, turn off the Show Invisible option in the Animate Options dialog box.

Force Solidity

Choose Force Solidity from the Appearance menu to toggle whether or not the selected objects will appear solid.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



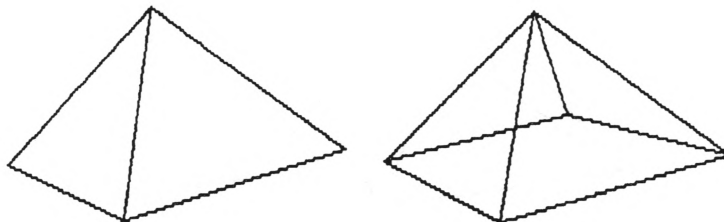
A solid object is an object completely enclosed by its surfaces and has no holes. A hollow object is not completely enclosed by its surfaces, which means it has a hole in it. Hollow objects display all of its surfaces all the time. A solid object will hide the surfaces that face away from the camera. When in the Display as Lines mode, solid objects reduce visual clutter. When in the Display as Solids mode, solid objects reduce the time it takes to calculate the image.

Forcing objects to appear solid is useful for certain objects, like imported DXF objects that are hollow, but look best when forced solid.

Force Hollowness

Choose Force Hollowness from the Appearance menu to toggle whether or not the selected objects will appear hollow.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



A solid object is an object completely enclosed by its surfaces and has no holes. A hollow object is not completely enclosed by its surfaces, which means it has a hole in it. Hollow objects display all of its surfaces all the time. A solid object will hide the surfaces that face away from the camera. When in the Display as Lines mode, hollow objects show all of their points and surfaces. When in the Display as Solids mode, hollow objects increase the time it takes to calculate the image, but appear correctly when the object has holes that can be seen through.

Forcing objects to appear hollow is useful for editing objects so that all the points and surfaces of the objects can be selected and therefore manipulated. To use this technique, choose Force Hollowness, select the desired points and surfaces, and then choose Undo. The points and surfaces remain selected but the object is reverted back to its previous state.

Inherit Orientation from Orientation

Choose **Inherit Orientation** from **Orientation** from the **Appearance** menu to toggle whether or not the selected objects' orientations will follow their parents' orientations.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the **Control** key will force the same dialog box to appear if there are selected objects.

When an object's orientation is inherited from its parent's orientation, the object will rotate *every* time the parent rotates. When an object's orientation is not inherited from its parent's orientation, the object will not rotate when the parent rotates.

This option is useful for when animating a hierarchical chain of objects, like a jointed arm. If the forearm is a child of the upper arm, then the upper arm should automatically rotate the forearm whenever the upper arm rotates. Having the forearm's orientation inherit the orientation of the upper arm will accomplish this task.

If the selected object has no parent, then the option will still be set, although the setting won't take effect until the object is linked to another object. Use the **Link** tool to link objects.

The default is for inheritance to be enabled.

Inherit Position from Orientation

Choose Inherit Position from Orientation from the Appearance menu to toggle whether or not the selected objects' positions will follow their parents' orientations.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

When an object's position is inherited from its parent's orientation, the object will move around the parent *every* time the parent rotates. When an object's position is not inherited from its parent's orientation, the object will not move when the parent rotates.

This option is useful for when animating a hierarchical chain of objects, like a jointed arm. If the forearm is a child of the upper arm, then the upper arm should automatically keep the forearm positioned at its end whenever the upper arm rotates. Having the forearm's position inheriting the orientation of the upper arm will accomplish this task.

If the selected object has no parent, then the option will still be set, although the setting won't take effect until the object is linked to another object. Use the Link tool to link objects.

The default is for inheritance to be enabled.

Inherit Position from Size

Choose Inherit Position from Size from the Appearance menu to toggle whether or not the selected objects' positions will follow their parents' sizes.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

When an object's position is inherited from its parent's size, the object will move with the parent *every* time the parent resizes. When an object's position is not inherited from its parent's size, the object will not move when the parent resizes.

This option is useful for when animating a hierarchical chain of objects, like a jointed arm. If the forearm is a child of the upper arm, then the upper arm should automatically keep the forearm positioned at its end whenever the upper arm resizes. Having the forearm's position inheriting the upper arm's size will accomplish this task.

If the selected object has no parent, then the option will still be set, although the setting won't take effect until the object is linked to another object. Use the Link tool to link objects.

The default is for inheritance to be enabled.

Inherit Size from Size

Choose **Inherit Size** from **Size** from the **Appearance** menu to toggle whether or not the selected objects' sizes will follow their parents' sizes.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the **Control** key will force the same dialog box to appear if there are selected objects.

When an object's size is inherited from its parent's size, the object will resize with the parent *every* time the parent resizes. When an object's size is not inherited from its parent's size, the object will not resize when the parent resizes.

This option is useful for when animating a hierarchical chain of objects, like a jointed arm. If the forearm is a child of the upper arm, then the upper arm should automatically keep the forearm at the same relative size whenever the upper arm resizes. Having the forearm's size inherit the upper arm's size will accomplish this task.

If the selected object has no parent, then the option will still be set, although the setting won't take effect until the object is linked to another object. Use the **Link** tool to link objects.

The default is for inheritance to be enabled.

Align Menu

The Align menu contains commands for positioning, orienting, and sizing objects in precise ways.

Every world contains two default objects that are used for aligning: the Ground and the Anchor. The Ground is the gray grid, and the Anchor is the blue cross. In general, objects can be positioned at the Anchor's location, and objects can be oriented to face the Ground. Also, objects can be dropped onto the Ground and slid into place.

The Ground and the Anchor cannot be animated because their use is for editing, not animation.

Align	
Align Editing Cameras	⌘L
Orient Ground to Surface	⌘B
<i>Orient to Ground</i>	⌘U
<i>Orient to Point at Anchor</i>	
<i>Orient to Face Camera</i>	
Position Ground	⌘;
<i>Position to Ground</i>	⌘K
Position Anchor	⌘H
<i>Position to Anchor</i>	⌘J
<i>Position at Camera</i>	
Size...	⌘F
Measure Distance	⌘D
Reset Orientation	
<i>Reset Orientation Facing Camera</i>	
Reset Size	
Home Ground	

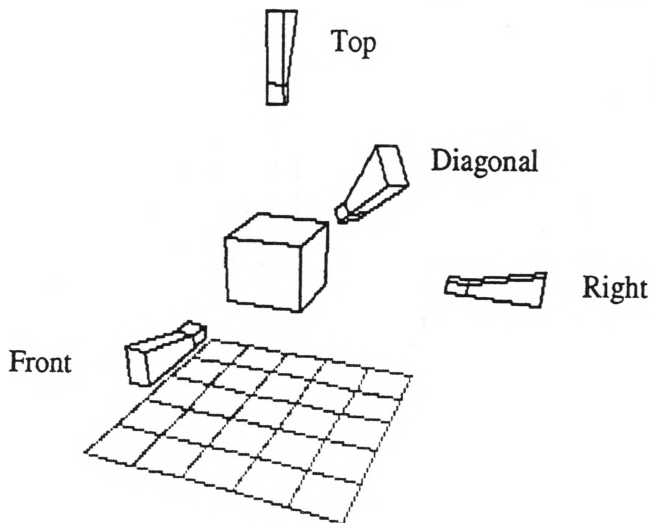
Menu items that appear *italicized* indicate that the selected objects will animate the action of the command if the time has changed.

Align Editing Cameras

Shortcut: Command-L

Choose Align Editing Cameras from the Align menu to position and orient the editing cameras (Front, Right, Top, and Diagonal) so that they will view the selected objects as close as possible to fill most of the image. With the editing cameras aligned to an object or several objects, it is easy to make precise changes to the objects.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The four editing cameras are aligned to view the cube object from the front, right, top, and diagonal directions.)

The editing cameras will position and orient themselves to view the objects from the traditional front, right, top, and diagonal views.

If only one object is selected and the Option key is pressed when choosing this command, the editing cameras will synchronize their orientations to the orientation of the selected object.

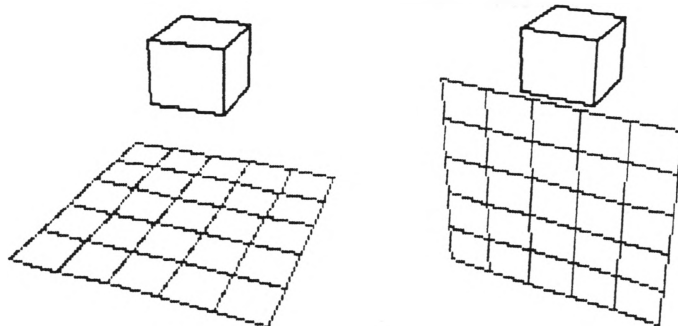
If the Command key is pressed when choosing this command, the orientation of the editing cameras will be based upon the orientation of the current camera. For example, if the Front camera is the current camera and it has been moved and oriented to view the objects from a different vantage point, the Front camera will be reset to its normal front-viewing orientation if this command is chosen. However, holding down the Command key keeps the Front camera in its place and adjusts the other editing cameras around the Front camera's orientation. The same applies to the other editing cameras if they are the current camera.

The editing cameras are special and cannot be animated or deleted.

Orient Ground to Surface

Shortcut: Command-B

Choose Orient Ground to Surface from the Align menu to orient the Ground to the same orientation as one selected surface. Only one surface can be selected for this command to work.



(The Ground is made to have the same orientation as the cube's front surface.)

Use this command as the first step to orienting an object to a particular orientation. First orient the Ground to a known orientation, and then orient the object to the Ground's orientation.

The Ground is special and cannot be animated.

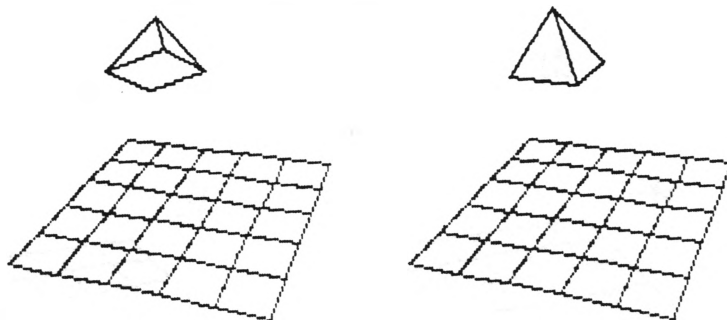
Orient to Ground

Shortcut: Command-U

Choose Orient to Ground from the Align menu to orient all selected objects to face the Ground.

If a selected object has one selected surface, then the selected surface will face the Ground. If a selected object does not have one selected surface, this command will use the closest facing surface of the object's box to the Ground.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(A pyramid's bottom surface is oriented to face the Ground.)

Use this command as the second step to orienting an object to a particular orientation. First orient the Ground to a known orientation, and then orient the object to the Ground's orientation.

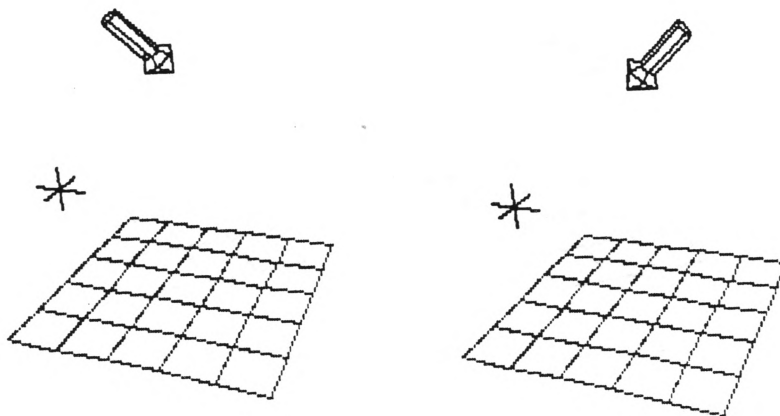
If an Orientation attribute doesn't already exist at the current time for an object, a new Orientation attribute will be created. The object will animate its orientation if a new attribute is created.

Orient to Point at Anchor

Choose Orient to Point at Anchor from the Align menu to point all selected objects at the Anchor.

If a selected object has one selected surface, then the selected surface will face the Anchor. If a selected object does not have one selected surface, the object's backside will point at the Anchor. The backside of an object is the side furthest away from the camera when the object was created.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(A directional light is made to point at the Anchor.)

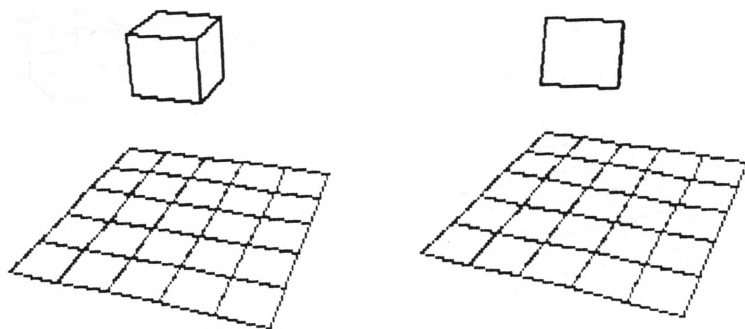
If an Orientation attribute doesn't already exist at the current time for an object, a new Orientation attribute will be created. The object will animate its orientation if a new attribute is created.

Orient to Face Camera

Choose Orient to Face Camera from the Align menu to orient all selected objects to face the current camera.

If a selected object has one selected surface, then the selected surface will face the current camera. If a selected object does not have one selected surface, this command will use the closest facing surface of the object's box to the current camera.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The cube's front surface is oriented to face the camera.)

This command is useful for when a particular surface needs to face forward.

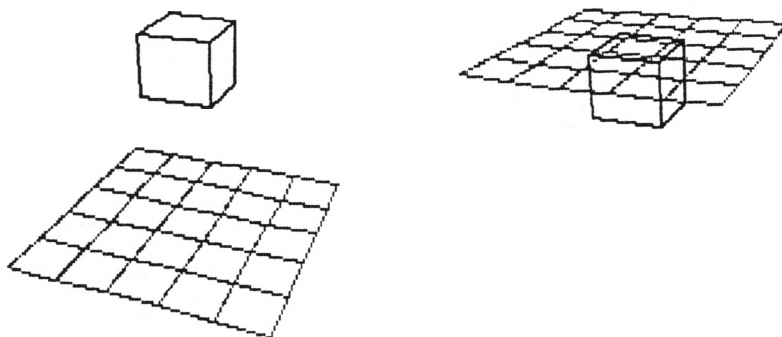
If an Orientation attribute doesn't already exist at the current time for an object, a new Orientation attribute will be created. The object will animate its orientation if a new attribute is created.

Position Ground

Shortcut: Command-;

Choose Position Ground from the Align menu to move the Ground to the middle of the selected objects. If the selected objects have selected points and surfaces, then the middle of these points and surfaces is where the Ground will be positioned.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The Ground is positioned to the top surface of the cube.)

This command is best used immediately after the Orient Ground to Surface command. After positioning the Ground to the surface, the Ground will have the same orientation and position as the surface. Other objects can be oriented to the Ground and subsequently dropped onto the Ground. Once on the Ground, the objects can be slid on the Ground and into place. This is how objects are aligned to each other.

The Ground is special and cannot be animated.

Position to Ground

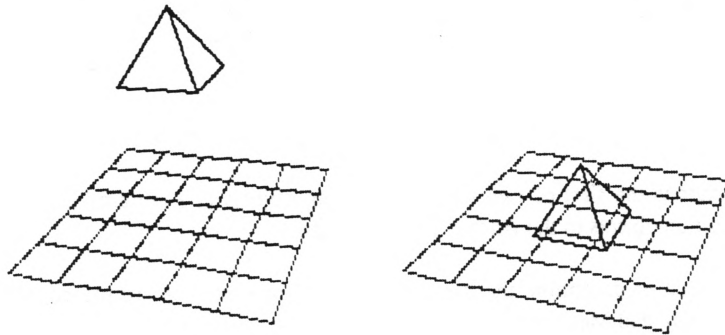
Shortcut: Command-K

Choose Position to Ground from the Align menu to move the selected objects to the Ground. The objects will move straight up or straight down toward the Ground, depending if the objects are above or below the Ground. In other words, the objects will drop down or rise up to the Ground. For this command, the Ground's boundaries can be thought to extend infinitely so that the objects will have some place to "land" even if the objects aren't directly over or under the Ground.

If the selected objects have selected points and surfaces, then the middle of these points and surfaces will be moved to the Ground. If a selected object does not have selected points and surfaces, this command will use the closest facing surface of the object's box to the Ground.

If the Option key is held down, then all the selected objects will move as a whole, and not all land on the Ground. By default, the middle of the selected objects will be moved to the Ground. If the selected objects have selected points and surfaces, then the middle of these points and surfaces will be moved to the Ground.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The pyramid object is positioned onto the Ground.)

This command is one of the most useful aligning commands. Once the Ground is oriented and positioned as desired, objects can be dropped down onto the Ground and slid into place with the Move tool. (Remember to use the Move tool's On Ground option to constrain objects onto the Ground.)

If a Position attribute doesn't already exist at the current time for an object, a new Position attribute will be created. The object will animate its position if a new attribute is created.

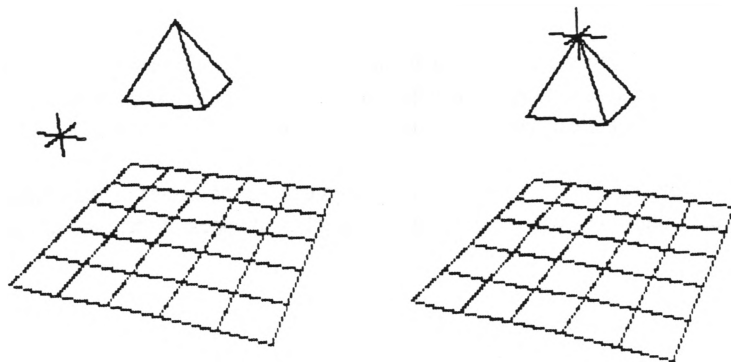
Position Anchor

Shortcut: Command-H

Choose Position Anchor from the Align menu to move the Anchor object to the middle of the selected objects. If the selected objects have selected points and surfaces, then the middle of these points and surfaces is where the Anchor will be positioned.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

This command works regardless if the Anchor is hidden or not.



(The Anchor is positioned at the top point of the pyramid.)

Positioning the Anchor is the first of two steps for placing objects at a certain location. First position the Anchor, and then position objects to the Anchor's new location.

The Anchor is also used to determine the distance at which new objects are placed when created with the Rectangle, Oval, Polygon, and Mesh tools.

The Anchor is special and cannot be animated.

Position to Anchor

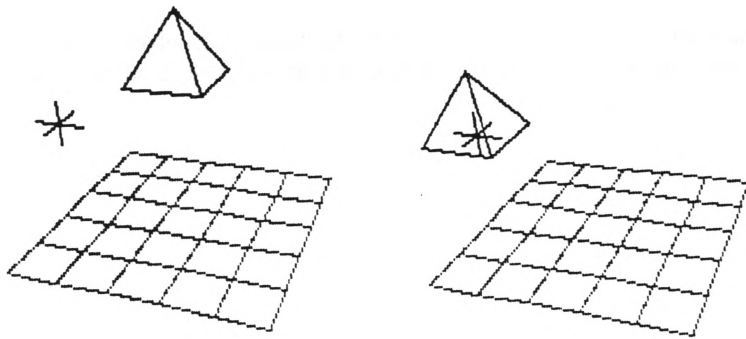
Shortcut: Command-J

Choose Position to Anchor from the Align menu to move all the selected objects to the Anchor; the objects will appear to clump together on the Anchor.

If the Option key is held down, then all the selected objects will move as a whole, and not clump together at the Anchor. By default, the middle of the selected objects will be moved to the Anchor. If the selected objects have selected points and surfaces, then the middle of these points and surfaces will be moved to the Anchor.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

This command works regardless if the Anchor is hidden or not.



(The pyramid is positioned at the Anchor.)

If a Position attribute doesn't already exist at the current time for an object, a new Position attribute will be created. The object will animate its position if a new attribute is created.

Position at Camera

Choose Position at Camera from the Align menu to put the selected objects at the current camera's position. The selected objects will also inherit the same orientation as the current camera.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

This command is useful in situations where the current camera has an interesting position and orientation and another object should have that exact position and orientation too. Such is the case when another camera should take the place of the current camera because the current camera will have to move. Or, the current camera is the perfect position for a light.

Note: Positioning an object at the current camera's location will affect what you can see if the image is in Display as Solids mode; the object will most likely cover the camera's view.

If a Position attribute doesn't already exist at the current time for an object, a new Position attribute will be created. The object will animate its position if a new attribute is created. Because the orientation is also changed, the same applies for Orientation attributes.

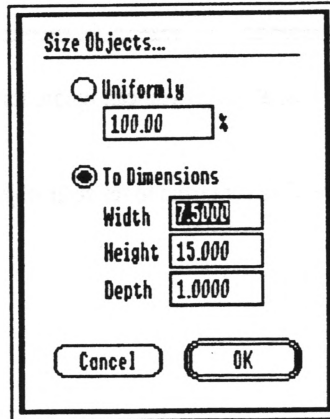
Size

Shortcut: Command-F

Choose Size from the Align menu to change the size of all selected objects. Objects can be sized uniformly, or they can be sized to fit a set of dimensions.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

The Size Options dialog box will appear.



The Size Objects dialog box is divided into two main options: sizing uniformly, and sizing to dimensions. The options apply to all of the selected objects.

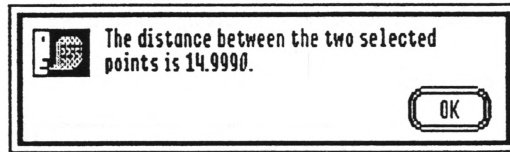
- Uniformly — If this option is enabled, the value in the box sizes an object by a percentage of the object's current size. The object maintains its proportions because the object is sized equally about its width, height, and depth. For example, setting the value to 50% would make the object half as big. Setting the value to 300% would make the object three times as big.
- To Dimensions — If this option is enabled, the values in the Width, Height, and Depth boxes are used to size the object to an exact size. The units of the dimensions are abstract, but can be thought of as inches (e.g. 4.5 = four and a half inches.) The way an object is oriented to face the camera is the way Animasia 3-D determines which part of the object is associated with the width, the height, and the depth.

If a Size attribute doesn't already exist at the current time for an object, a new Size attribute will be created. The object will animate its size if a new attribute is created.

Measure Distance

Shortcut: Command-D

Choose Measure Distance from the Align menu to report the distance between any two selected points. If only one point is selected, then the distance between the point and the current camera is reported. If one point and one surface are selected, the closest distance between the point and the plane of the surface is reported.



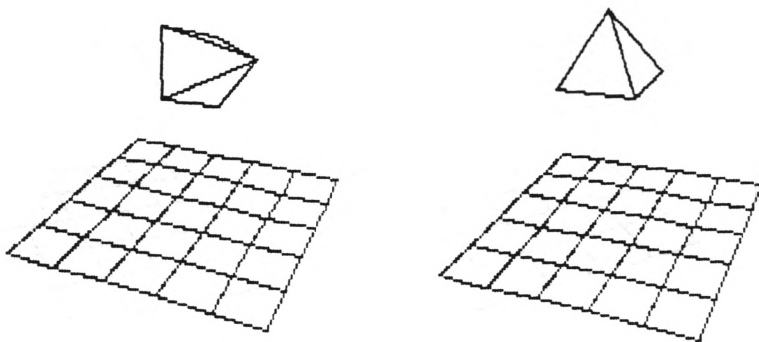
The units of measurement are in inches, although you can ignore this entirely and mentally substitute your own unit of measurement.

Measured distances can be used by the Size command to resize an object to an exact dimension.

Reset Orientation

Choose Reset Orientation from the Align menu to make the orientations of all selected objects zero degrees.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The pyramid's orientation is reset.)

This command is useful for when an object's orientation is not what you want and you would like to start reorienting over from scratch.

The difference between this command and Reset Orientation Facing Camera is that this command does an absolute reset; the other does a relative reset.

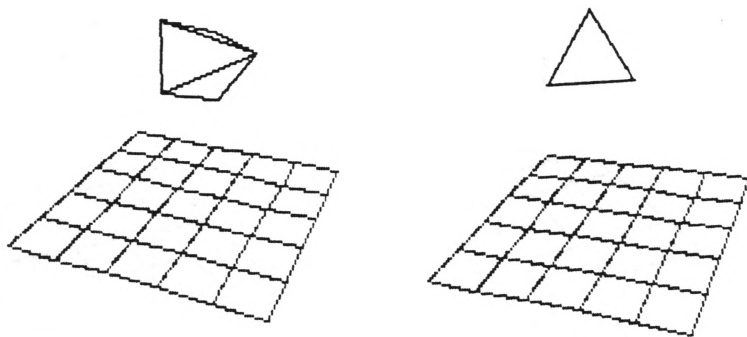
You can verify the results of this action by choosing Object Info and examining the Orientation attribute for the selected objects. In the Orientation boxes, you will see 0, 0, 0.

If an Orientation attribute doesn't already exist at the current time for an object, a new Orientation attribute will be created. The object will animate its orientation if a new attribute is created.

Reset Orientation Facing Camera

Choose Reset Orientation Facing Camera from the Align menu to make the orientations of all selected objects be the current camera's orientation. The effect is that the objects appear to face the camera.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



(The pyramid's orientation is reset to be the camera's orientation.)

The difference between this command and Reset Orientation is that this command does a relative reset based on the current camera; the other does an absolute reset.

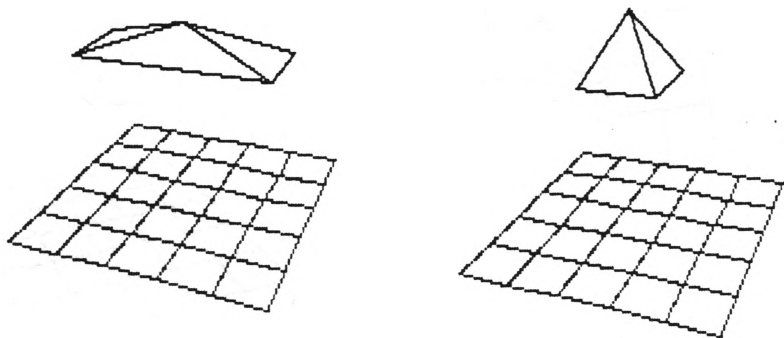
You can verify the results of this action by choosing Object Info and examining the Orientation attribute for the selected objects. In the Orientation boxes, you will see values which are exactly the same as the current camera's orientation values. (The current camera's can be examined by choosing Info from the Camera menu.)

If an Orientation attribute doesn't already exist at the current time for an object, a new Orientation attribute will be created. The object will animate its orientation if a new attribute is created.

Reset Size

Choose Reset Size from the Align menu to reset the size of all selected objects to 100% of the objects' original size.

If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.



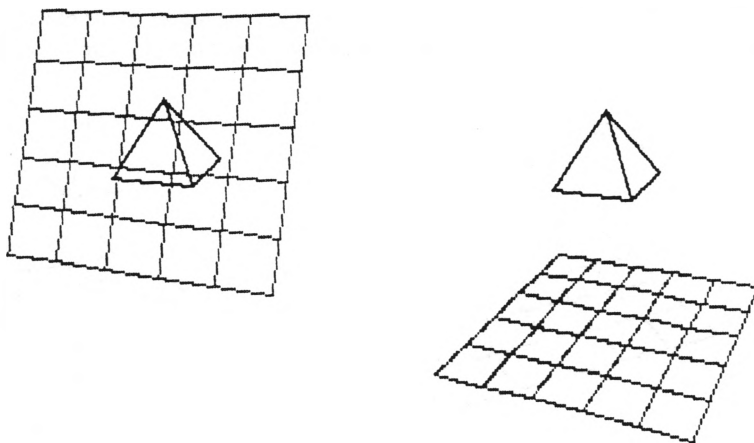
(The pyramid's size is reset.)

You can verify the results of this action by choosing Object Info and examining the Size attribute for the selected objects. In the Size boxes, you will see 100, 100, 100.

If a Size attribute doesn't already exist at the current time for an object, a new Size attribute will be created. The object will animate its size if a new attribute is created.

Home Ground

Choose Home Ground from the Align menu to put the Ground back in its original, or home, state. The Ground's home is at the center of the world at coordinates 0,0,0. The Ground's orientation is also reset to zero. The size and other attributes are not affected.



(The Ground's position and orientation are returned to their home state.)

Homing the Ground is useful for when the Ground has been used to orient objects and the Ground may then have a confused-looking orientation. Homing will return the Ground to a familiar state.

The Ground is special and cannot be animated.

Camera Menu

Camera	
✓ Main	⌘0
Front	⌘1
Right	⌘2
Top	⌘3
Diagonal	⌘4
Make Object Current	
Move In	⌘+
Move Out	⌘-
Point at Objects	
Untilt to Ground	⌘\
✓ Perspective	⌘V
Field of View...	
Info...	
Add Camera	

The Camera menu contains commands to manipulate and look through different cameras.

Default Cameras

Every world contains five default cameras:

- Main: The only default camera that can be animated.
- Front: Editing camera that looks at the front of objects. It cannot be animated.
- Right: Editing camera that looks at the right side of objects. It cannot be animated.
- Top: Editing camera that looks at the top side of objects. It cannot be animated.
- Diagonal: Editing camera that looks diagonally down and to the right on objects. It cannot be animated.

Because the Main camera can be animated, it should be used to view the world as it should appear for the animation. Likewise, because the editing cameras (Front, Right, Top, Diagonal) cannot be animated, they are useful for moving in close to better see object relationships, or pulling back far to see how all objects work together. The key command for effectively using the editing cameras is Align Editing Cameras from the Align menu.

Current Camera

Almost all of the Camera menu commands work with the current camera. The current camera is the camera that is being looked through.

If the current camera is one of the default cameras, a check mark will appear next to that camera's name in the Camera menu.

The current camera's name also appears in the World window's title; it's in parentheses after the dash, like "Untitled" (World - Main).

The current camera cannot be selected.

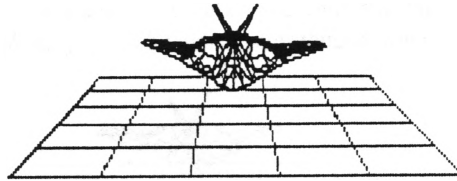
Cameras Group

Cameras are objects just like any other object. Because cameras are objects, they have their own group, the "Cameras" group. The "Cameras" group is initially set to be hidden so that the cameras don't clutter the world.

Main

Shortcut: Command-0

Choose Main from the Camera menu to make the Main camera the current camera.



The main camera is the only default camera that can be animated and should be used to view the world's animation. It cannot be deleted.

Front

Shortcut: Command-1

Choose Front from the Camera menu to make the Front camera the current camera.

The Front camera looks at the front side of objects. The Front camera is one of the four special editing cameras that are used to view objects and object relationships without disturbing the Main camera.



The key command for effectively using the editing cameras is Align Editing Cameras from the Align menu.

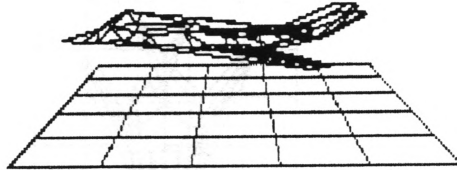
The Front camera cannot be animated or deleted.

Right

Shortcut: Command-2

Choose Right from the Camera menu to make the Right camera the current camera.

The Right camera looks at the right side of objects. The Right camera is one of the four special editing cameras that are used to view objects and object relationships without disturbing the Main camera.



The key command for effectively using the editing cameras is Align Editing Cameras from the Align menu.

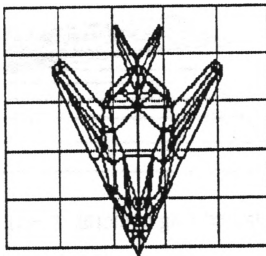
The Right camera cannot be animated or deleted.

Top

Shortcut: Command-3

Choose Top from the Camera menu to make the Top camera the current camera.

The Top camera looks at the top side of objects. The Top camera is one of the four special editing cameras that are used to view objects and object relationships without disturbing the Main camera.



The key command for effectively using the editing cameras is Align Editing Cameras from the Align menu.

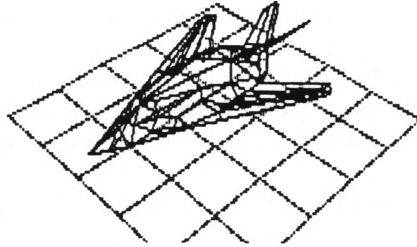
The Top camera cannot be animated or deleted.

Diagonal

Shortcut: Command-4

Choose Diagonal from the Camera menu to make the Diagonal camera the current camera.

The Diagonal camera looks diagonally at the front, right, top side of objects. The Diagonal camera is one of the four special editing cameras that are used to view objects and object relationships without disturbing the Main camera.



The key command for effectively using the editing cameras is Align Editing Cameras from the Align menu.

The Diagonal camera cannot be animated or deleted.

Make Object Current

Choose Make Object Current from the Camera menu to make the one selected object the current camera.

If there is no selected object, or there is more than one selected object, a dialog box will ask you to choose the name of the object you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

Any object can be made the current camera, except for objects that are part of a linked, parent-child hierarchy.

When an object other than a camera-type object is made the current camera, the result is often a blank image. The object-as-camera is pointing off into empty space. To help orient the object-as-camera, choose Point At Objects from the Camera menu. You can choose from a list of objects to look at, like the Ground.

This command is useful for viewing the world from a different, temporary position. It can also be used to position hard to place objects, such as lights, using the Camera tool in the Tool window in conjunction with the Move and Rotate tools. (See the Camera tool for details.)

Spotlight objects that are made to be the current camera will display a circle on the image showing the spotlight's area of influence, or cone of light. The color of the circle is the color of the spotlight's light. Tip: The spotlight's cone of light is the same as the field of view attribute. Changing the field of view changes the spotlight's cone.

Move In

Shortcut: Command +

Choose Move In from the Camera menu to move the current camera straight forward.

The distance of the movement is 100 units, or inches. Holding down the Shift key while choosing this command constrains the movement of the camera to 25 units.

If the current camera is an editing camera, not only will the current editing camera move in, but the other three editing cameras will move themselves forward as well. Holding down the Option key will move only the current editing camera and not affect the other three editing cameras.

If the current camera is not an editing camera, and the time has changed, the moving action will be animated.

Move Out

Shortcut: Command -

Choose Move Out from the Camera menu to move the current camera straight backward.

The distance of the movement is 100 units, or inches. Holding down the Shift key while choosing this command constrains the movement of the camera to 25 units.

If the current camera is an editing camera, not only will the current editing camera move out, but the other three editing cameras will move themselves backward as well. Holding down the Option key will move only the current editing camera and not affect the other three editing cameras.

If the current camera is not an editing camera, and the time has changed, the moving action will be animated.

Point at Objects

Choose Point at Objects from the Camera menu to point the current camera at the middle of the selected objects. If the selected objects have selected points and surfaces, the middle of those points and surfaces will be used to aim the camera.

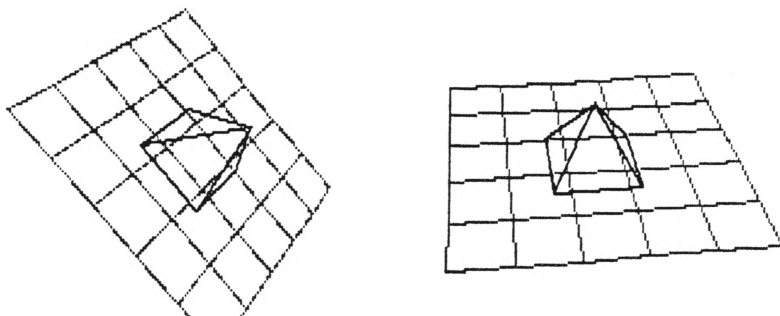
If there are no selected objects, a dialog box will ask you to choose the names of the objects you would like to use. Holding down the Control key will force the same dialog box to appear if there are selected objects.

If the current camera is not an editing camera, and the time has changed, the orienting action will be animated.

Untilt to Ground

Shortcut: Command-\

Choose Untilt to Ground from the Camera menu to stand the current camera straight up compared to the Ground.



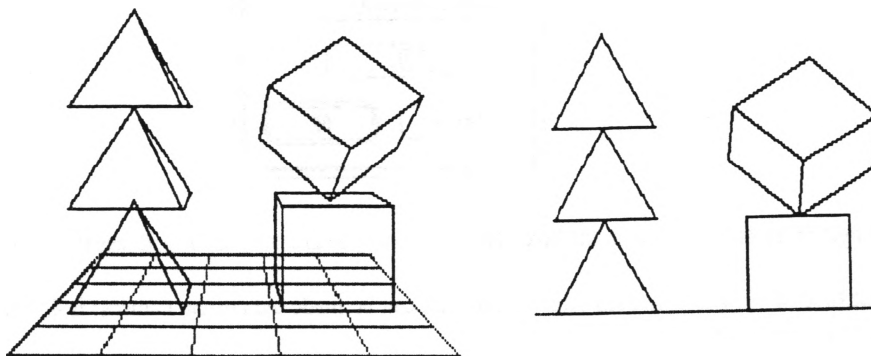
(The current camera is untilted relative to the Ground.)

If the current camera is not an editing camera, and the time has changed, the orienting action will be animated.

Perspective

Shortcut: Command-Y

Choose Perspective from the Camera menu to toggle whether or not the world's objects will appear in perspective. Perspective is on by default.



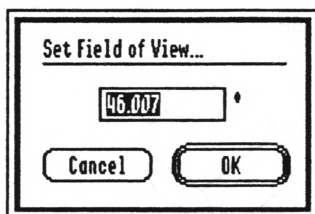
(The objects appear in perspective, but their exact relationships are hard to judge. The objects appear in non-perspective, and their relationships are easily discerned.)

Perspective is the effect where objects further away from the camera appear smaller than objects closer to the camera. Turning the perspective off makes all objects look flat and dimensionless, which is invaluable for editing purposes. While perspectiveness skews objects, non-perspectiveness shows objects in their actual relation to other objects. When aligning objects, it is best to turn off perspective temporarily.

Tip: Sometimes after a command from the Align menu is performed, the result doesn't look as it should. The action was correctly performed, but due to perspective, the objects appear skewed. The way to verify any editing action is to turn off Perspective temporarily. Non-perspectiveness shows objects as they actually are in relation to each other.

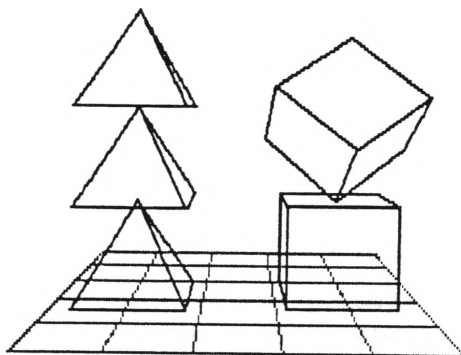
Field of View

Choose Field of View from the Camera menu to change the current camera's field of view.

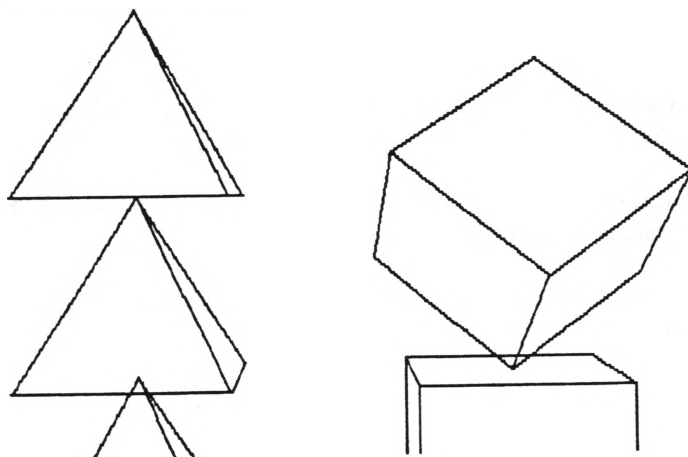


Type the angle of the field of view in the box. The value must be greater than 0° and less than 180° .

The default field of view for cameras (and objects that can be made the current camera) is 45° or 46° , which is equivalent to a real life 50mm camera lens.



(A 46° field of view.)



(A 25° field of view.)

If the current camera is not an editing camera, and the time has changed, the changed field of view action will be animated.

Info

Choose Info from the Camera menu to view the current camera's attributes. This is the same as choosing Info from the Object menu. See Info of the Object menu for details on this command.

Because the current camera cannot be selected and therefore used quickly with Info from the Object menu, this is the fastest way to view and edit the attributes of the current camera.

If the current camera is not an editing camera, and the time has changed, any changes made to the camera's attributes will be animated.

Add Camera

Choose Add Camera from the Camera menu to add a new camera to the world. The new camera is positioned and oriented exactly as the current camera. The added camera is then made the current camera.

Added cameras can be animated, like the Main camera, and are white by default. The new camera is put into the “Cameras” group.

This command is useful when a particular viewpoint needs to be saved for later, or you just don’t want to animate the Main camera.

Image Menu

The Image menu contains commands and options relating the image. The image is what you see in the World window.

The most important feature of the image is that it can display the world's objects as lines or as solids. When displaying as solids, you have four more options related to the way the objects are colored and shaded. You'll most likely display objects as lines for editing and then as solids for animating.

Image	
✓ Display as Lines	⌘[
Display as Solids	⌘]
✓ Shading	
Shades of Gray	
✓ Color Mixing	
Color Filtering	
Set Background Color	
White Background	
Set Scale...	
Toggle Full Screen	⌘
Toggle Menu Bar	⌘M
Redraw	⌘'

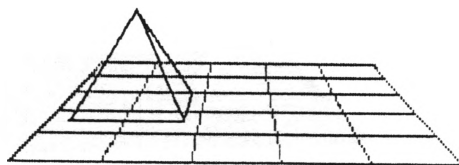
Additionally, the image's background color and scale can be set from the Image menu. There are a few additional commands not directly related to images, but are included as well; they deal with making the World window the size of the full screen and hiding the menu bar.

If an image is taking too long to draw, clicking the mouse, pressing the ESC key, or pressing Command and Period together will stop the image from drawing and show what it has been drawn so far. If an image is partially drawn, the objects are still there, but just cannot be seen; they can even be edited in the normal way because you can select and act upon them. Sometimes, you may accidentally click while the image is drawing, or your mouse button may bounce and click twice, which will stop the drawing. This is not a problem. Choosing Redraw from the Image menu will redraw the entire image.

Display as Lines

Shortcut: Command-[

Choose Display as Lines from the Image menu for the world's objects display themselves as lines instead of as solids.



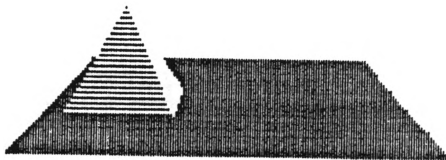
Line images draw much faster than solid images and therefore the Lines option is most useful for editing. It is also the default mode.

Clicking the mouse will prematurely stop any redrawing. Choosing Redraw from the Image menu will redraw the entire image.

Display as Solids

Shortcut: Command-]

Choose Display as Solids from the Image menu for the world's objects display themselves as solids instead of as lines.



Solid images draw slower than line images and therefore the Solids option is best used for previews and animations.

Solid images have four more options which affect its quality. They are:

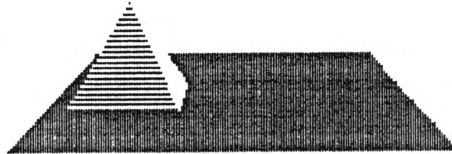
- Shading
- Shades of Gray
- Color Mixing
- Color Filtering

These options are discussed individually.

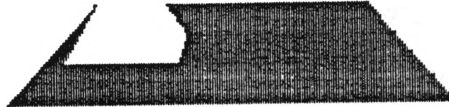
Clicking the mouse will prematurely stop any redrawing. Choosing Redraw from the Image menu will redraw the entire image.

Shading

Choose Shading from the Image menu to toggle whether or not objects will be lit and shaded by the lights. This option only applies to the Display as Solids mode and does not affect Display as Lines.



(The world shaded. The Ground doesn't appear shaded because the light source, the Directional light, is striking it obliquely.)



(The world not shaded.)

Shaded objects will have highlights where the objects' surfaces face the light sources and darkness where the surfaces face away from the lights. Note: Currently, Animasia 3-D does not create shadows.

Shading takes extra time for Animasia 3-D to calculate. Complex scenes with thousands of surfaces will take longer to display than simpler scenes with hundreds of surfaces. Therefore, it is best to create objects that are simple and have a minimum number of surfaces.

Shades of Gray

Choose Shades of Gray from the Image menu to toggle whether or not objects will be displayed with a palette of grays or colors. This option applies to the Display as Solids mode as well as the Display as Lines mode. The default is for this option to be off (colors are displayed).

Displaying images using grays instead of colors is beneficial with the Shading option turned on because grays provide a broader range of intensities than colors. Grays will show subtler shading detail and are useful for checking the effects of lighting.

The intensities of gray that can be visible at one time is determined by the mode of the image. When editing or animating at 640 x 200 Pixel resolution, the following apply:

- Color Mixing off — 11 shades of gray
- Color Mixing on — 21 shades of gray

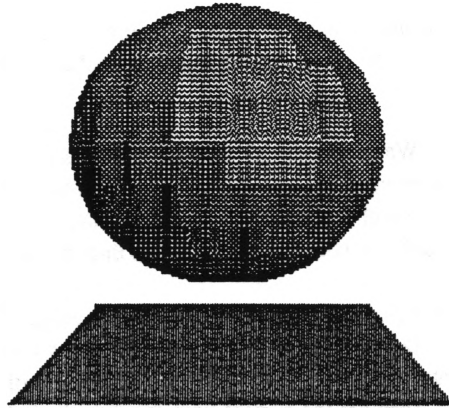
When animating in 320 x 200 mode, the following apply:

- Color Mixing off — 15 shades of gray
- Color Mixing on — 29 shades of gray

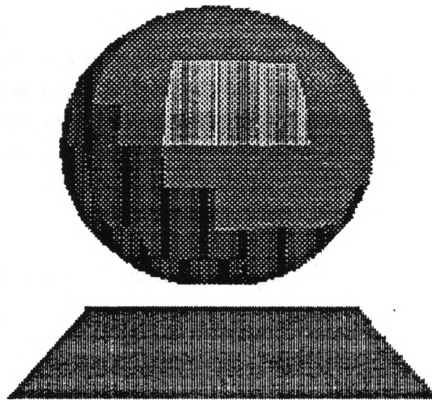
Shades of gray include black and white.

Color Mixing

Choose Color Mixing from the Image menu to toggle whether or not colors will be blended to achieve the appearance of more colors. This option only applies to the Display as Solids mode and does not affect Display as Lines. The default is for Color Mixing to be turned on.



(The ball is shaded with Color Mixing on. To see better the subtleties of shading, it is best to turn on the Shades of Gray option.)



(The ball is shaded with Color Mixing off.)

For all practical purposes, the Apple IIGS has a limit of displaying 16 colors at a time. With Color Mixing turned on, Animasia 3-D combines colors to achieve approximately 64 different colors. The results may or may not be to your liking due to the current nature of the blending. Turning off Color Mixing produces cleaner results but shading detail is severely limited.

Color Filtering

Choose Color Filtering from the Image menu to toggle whether or not the color filtering option is enabled. This option only applies to the Display as Solids mode and does not affect Display as Lines. In addition, the Shading option must be on for Color Filtering to work.

Color Filtering is an advanced option that can produce fading effects. When this option is on, the color of the current camera acts as a light filter. Only the objects' colors that are the same as the camera's color to pass through to the image.

Cameras are white by default. White contains all the colors of the spectrum and allows all colors to pass through the camera unaffected. Black prevents all colors from passing through the camera. Middle gray allows half the intensity of all colors to pass through the camera. If a color is used for the camera, the process works the same way: a red camera will allow only red colored objects to pass through the camera and appear on the image.

A fading effect can be animated easily. For instance, to fade the image from black to white, set the current time to when you want to start the fading, like 00:00.00. While holding down the Control key, click on the black color in the palette. The Control key, when used for picking a color, will change the color of the *current camera*, and not the selected objects. Then set the current time to when the fading should end, like 00:01.00. Just as before, hold down the Control key and click this time on the white color in the palette. When animating, the world will fade from black to the objects' full color intensity. Be sure to use a camera that can be animated, like the Main camera and not the editing cameras (Front, Right, Top, and Diagonal).

Unlike a real world lens filter, Color Filtering can intensify colors. By manually changing the color of the camera to a color that is, say, 200% white, you will double the intensity of light that passes through the camera and onto the image. 300% will triple the intensity, and so on. The way to accomplish this is to choose the Info command from the Camera menu (or Info from the Object menu). Where it says Body Color, enter 200 into the three adjacent boxes. The color of the camera then will be 200% white. (Any value over 100% or less than 0% cannot exist in the real world, but will work perfectly in Animasia 3-D's artificial worlds.) The effect is that the colors will appear washed out and over-exposed.

Note: This advanced command should be used thoughtfully. If the camera is black and the world is in Display as Solids mode (with Shading on), the objects will not be visible; no light will be passing through the camera onto the image. This can be confusing if you expect to see objects. A quick way to remedy the situation would be to do any of the following:

- Turn off the Color Filtering option.
- Turn off the Shading option.
- Use the Display as Lines mode.

The default is for Color Filtering to be turned off.

Set Background Color

Choose Set Background Color from the Image menu to set the world's background color to the highlighted color in the palette. A shortcut is to hold down the Shift key while clicking on a color in the palette.

If an object has the same color as the background, the object will blend in and seemingly disappear. The object can still be edited normally. To see the object, change the background to a different color.

The background color cannot be animated and is constant throughout an animation.

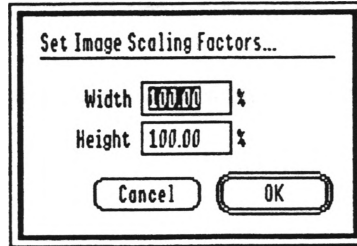
White Background

Choose White Background from the Image menu to make the background white. This feature is a shortcut for the Set Background Color command when a white background is quickly needed.

A check mark will appear next to this menu item if the background is white. Unchecking the check mark will make the background black.

Set Scale

Choose Set Scale from the Image menu to set the aspect ratio of the image. A dialog box will appear.



Entering a value in the Width box changes the width of the image by the percentage you enter. Entering a value in the Height box changes the height of the image. Values larger than 100% will expand the size of the image so that the objects appear larger, while values smaller than 100% will shrink the size of the image so that the objects appear smaller.

The image's scale cannot be animated and is set to a default of 100%.

Setting the scale of an image is useful if the image will be output to a printer that requires images to be stretched. For example, to get the best output from an ImageWriter II printer, pictures should be 2.4 times taller than they are wide. Setting the width of the image to 41.66% makes the width 2.4 times thinner than the height ($100\% \div 2.4 = 41.66\%$). Be sure to enable the ImageWriter's Vertical Condense option in the Page Setup dialog box if this method is used.

Toggle Full Screen

Shortcut: Command--Space Bar

Choose Toggle Full Screen from the Image menu to toggle whether or not the World window occupies the full screen.

This is useful for minor editing because the Tool window is covered by the World window. The menu bar can still be accessed.

Toggle Menu Bar

Shortcut: Command-M

Choose Toggle Menu Bar from the Image menu to toggle whether or not the menu bar is visible. This is useful in conjunction with the Toggle Full Screen command so that the World's window will have the entire screen to itself.

Note: When the menu bar is made invisible, the only way to make it visible again is by typing the Command-M shortcut.

Redraw

Shortcut: Command-`

Choose Redraw from the Image menu to redraw the entire image.

This command is useful for when the image is interrupted from being completely drawn. Interrupting the drawing process can occur in these ways:

- Clicking the mouse.
- Pressing Command and Period.
- Pressing the ESC key.

If an image is taking too long to draw, clicking the mouse, pressing the ESC key, or pressing Command and Period together will stop the image from drawing and show what it has been drawn so far. If an image is partially drawn, the objects are still there, but just cannot be seen; they can even be edited in the normal way because you can select and act upon them. Sometimes, you may accidentally click while the image is drawing, or your mouse button may bounce and click twice, which will stop the drawing. This is not a problem. Choosing Redraw will redraw the entire image.

When the current time changes, Animasia 3-D performs optimizations which calculate only the objects that change. Holding down the Option key while choosing Redraw will cause the world to completely recalculate all its objects and redraw the entire image. This is a security measure to guard against any unintended mistakes in Animasia 3-D; you shouldn't have to use this feature. So far, we have not had any reason to use it.

Animation Menu

The Animation menu contains commands and options related to animating objects.

Creating animations is accomplished by setting the current time and changing an object. For instance, creating an object at 00:00.00, setting the current time to 00:05.00 and moving the object to the other side of the World window creates an animation. The object will move in a straight line to the side of the window as time progresses frame by frame from 00:00.00 to 00:05.00.

Animation	
Set Time...	⌘T
✓ Auto-Tweening	⌘E
Animate to Window...	
Animate to Disk...	
Leave Trails	
Tween Attributes	
Untween Attributes	
Add Accel/Decel to Tween	
Duplicate Attributes	
Mark Object Position	
Mark Object Orientation	
Mark Object Size	
Mark Object Body Color	
Mark Camera Position	
Mark Camera Orientataion	
Mark Camera Field of View	
Mark Camera Body Color	

Set Time

Shortcut: Command-T or click on the word "Time" at the top of the World window.

Choose Set Time from the Animation menu to set the current time of a world. The Set Time dialog box will appear.

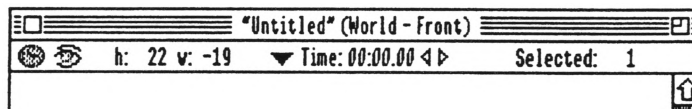


Time is displayed as 00:00.00, where the format is *minutes : seconds . frames*. Enter the minute in the first box. Up to 99 minutes are allowed per animation. Enter the second in the middle box. The range is from 0 to 59 seconds. Enter the frame in the last box. The frame depends upon the Frames Per Second setting, or FPS. For example, the default Frames Per Second is 3. Therefore, you could enter 0, 1, or 2 in the frame box. (Entering 3 would advance the second by 1 and reset the frame to 0.) If there were 15 frames per second, you could enter 0 to 14 in the frame box. Likewise, if there were 30 frames per second, you could enter 0 to 29 in the frame box. The Frames Per Second setting can be changed from the FPS pop-up menu in Timeline window.

Click Cancel to prevent the time from being changed.

Click Set or press the Return key to make the time current. If the Option key is held down while clicking Set, the time halfway between the previous time and the entered time will be calculated and set. This unlikely feature allows Animasia 3-D to compute the middle time between two other times for you.

Another way to change the current time is by clicking and dragging the black triangle to the left of the word "Time" at the top of the World window. This is faster, but more limited in range, than the above method.



Clicking on the hollow black triangles to the right of the word Time will decrement or increment the current time by one frame.

Pressing the left or right arrow keys on the keyboard decrements or increments the current time by one *frame*. Pressing the up or down arrow keys increments or decrements the current time by one *second*.

Creating animations is accomplished by setting the current time and changing an object. For instance, creating an object at 00:00.00, setting the current time to 00:05.00 and moving the object to the other side of the World window creates an animation. The object will move in a straight line to the side of the window as time progresses frame by frame from 00:00.00 to 00:05.00.

Auto-Tweening

Shortcut: Command-E

Choose Auto-Tweening from the Animation menu to toggle whether or not Tweens will be automatically created between new attributes and object attributes at previous times. Tweens appear as blue bars in the Timeline window. Tweens signify that the attributes on either end of the Tween will have all of their “in between” attributes calculated automatically. When this option is turned off, Tweens are not created between new attributes.

This important feature improves the ease with which animations are created. You do not need to know how to use it, leaving it on at all times, but as your animations grow more complex, it will be harder to create animations without an understanding of Auto-Tweening.

Here is an example to illustrate Auto-Tweening in action.

Step 1. Create an object at the time of 00:00.00.

Step 2. Set the time to 00:05.00.

Step 3. Move the object to the other side of the World window.

A basic animation has been created. The object will move in a straight line to the side of the window as time progresses frame by frame from 00:00.00 to 00:05.00.

Why? How does Animasia 3-D know to fill in all the in between positions for the object? The reason is because Auto-Tweening was turned on when the object was repositioned at the new time of 00:05.00. Animasia 3-D then knew to create all the in between positions of the object from 00:00.00 to 00:05.00. If Auto-Tweening was off, then Animasia 3-D would not create the in between positions. (In this case, the object would stay at its first position from 00:00.00 to 00:04.02 [assuming 3 frames per second] and then appear at its second position when 00:05.00 was reached.)

Examine the Timeline window to see exactly what Animasia 3-D is doing in relation to the Auto-Tweening option. The Timeline shows object attributes spread over time. To the right of the object names are markers on gray lines. The markers represent the object’s attributes at a specific time. If a blue bar connects the markers/attributes, then the attributes will be tweened across time for the duration of the blue bar.

When Auto-Tweening is enabled, and when new attributes are created, a blue bar will connect the new attribute to the previous attribute. (If there is no previous attribute, then the following attribute is connected to.) Thus, for every new attribute that is created outside of a Tween’s blue bar, the blue bar will extend to the new attribute. The result is an object that appears to move (or rotate, or resize, or any combination of any attribute) constantly through the animation. Obviously, this constant motion is not always desirable. Turning off Auto-Tweening will create attributes that have no connection to previous or following attributes.

The default is for Auto-Tweening to be on.

Animate to Window

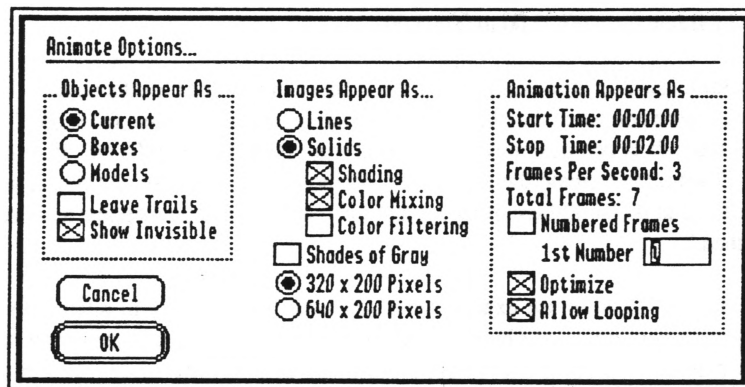
Animate to Disk

Choose either of the Animate commands from the Animation menu to animate all the objects in the World window using the current camera.

When choosing Animate to Window, the animation is not saved to disk—it is only displayed in the World window. This is useful for previewing the animation for mistakes.

When choosing Animate to Disk, the animation is displayed and saved to disk. Saving the animation to disk allows the animation to be played back later at a much faster rate than Animasia 3-D could create in real time. Also, the animation can be copied and distributed. The animation is saved in the popular Apple IIGS Paintworks animation format which can be used by other software packages like HyperStudio, HyperCard IIGS (with an XCMD), FLI Convert, DreamGrafix, Paintworks Plus or Gold, FinderView, Eye, or a dozen other freeware and shareware items of software.

The Animate Options dialog box will appear. If the Option key is held down when choosing Animate to Window or Animate to Disk, the dialog box will be skipped and the last set of options will be used immediately.



The Animate Options dialog box is divided into three sections: Objects, Images, and Animation. All options are in effect only for the duration of the animation. Some options are dimmed when choosing Animating to Window. Most of the options have a direct counterpart in the Appearance, Image, or Animation menus, and more detailed descriptions are covered in the appropriate menu sections of this manual.

Objects Appear As

- **Current** — The objects are displayed the way they currently are displayed in the World window: as models and boxes.
- **Boxes** — All objects are displayed as boxes. This speeds up calculations, and therefore the animation, considerably. This is useful for previewing the animation for timing mistakes.
- **Models** — All objects are displayed as models, not boxes. While creating the objects for the animation, it may have been necessary to make some complex objects appear as boxes to speed up the editing process. This option forces all objects to appear as models instead of boxes for the duration of the animation.
- **Leave Trails** — When enabled, the image will not erase itself between frames; the objects will appear to leave a trail behind themselves. This option is useful for seeing the objects' paths. When the animation is finished, the trails may still remain in the image, depending upon settings in the Images Appears As options. If the trails remain, they can be erased by turning off the Leave Trails option in the Animation menu.
- **Show Invisible** — When enabled, all invisible objects will still be visible in the animation. If this option is off, then all invisible objects will remain invisible.

Images Appears As

- **Lines** — When enabled, all objects display as lines. This is the faster image option.
- **Solids** — When enabled, all objects display as solids. This is the slower image option, although the results are more pleasing.
- **Shading** — Enables or disables the lighting of the world by the lights. When disabled, the objects will be displayed entirely with their body color.
- **Color Mixing** — Enables or disables the blending of colors to achieve more colors.
- **Color Filtering** — Enables or disables the current camera being used as a color filter for the overall image. Color Filtering only works when the Shading option is also enabled.
- **Shades of Gray** — Enables or disables displaying the objects as shades of gray instead of color.
- **640 x 200 Pixels** — When enabled, the animation has the resolution of the normal Apple IIGS desktop, like Animasia 3-D, HyperStudio, or the Finder. When creating animations that will be used by HyperStudio, this option should always be used, and not the 320 x 200 Pixels option below. (See the HyperStudio Tips.) Note that this option precludes the use of the Optimize option described below.
- **320 x 200 Pixels** — When enabled, the animation has the resolution which most Apple IIGS games use. The colors will be a bit clearer than the 640 x 200 Pixels option and will look better when recording the animation on a VCR. This option should not be used when the animation will be used by HyperStudio. Note that this option allows the use of the Optimize option described below.

Animation Appears As

- **Start Time** — Indicates when the animation will begin. This can be changed from the Timeline window by clicking and dragging the Start Time, green triangle, marker directly above the Timeline's attribute area. (Sometimes the green triangle is hidden underneath one of the other two markers or is out of view of the Timeline's scope.) If the Start Time is after the Stop Time, then the animation will play backward through time.
- **Stop Time** — Indicates when the animation will end. This can be changed from the Timeline window by clicking and dragging the Stop Time, red triangle, marker directly above the Timeline's list attribute area. If the Stop Time is before the Start Time, then the animation will play backward through time.
- **Frames Per Second** — Indicates how many frames will be displayed for every second of the animation. Lower frame rates will take less time for the animation to generate. The amount of frames per second can be changed from the Timeline window by clicking on the FPS pop-up menu.
- **Total Frames** — Indicates the number of frames in the animation. It is computed as Stop Time minus Start Time multiplied by Frames Per Second with one added frame at the end. (e.g. 00:02.00 - 00:00.00 * 3 FPS + 1 = 7 frames.)
- **Numbered Frames** — Determines if the animation will be saved to disk as a series of numbered images, which are Apple Preferred Format pictures, or as one Paintworks animation file. You will normally leave this option off, although a few applications, like HyperStudio and DreamGrafix, can create animations from numbered images. The extra level of flexibility that numbered frames affords you is useful only if you want to do post-production work on the frames before animating with HyperStudio or DreamGrafix. Post-production can include adding text, graphics, or painted special effects applied onto the frames. The file names for the numbered frame images will include the name you type when the Standard Save Box appears plus a four-digit number (e.g. Frame.0000, Frame.0001, Frame.0002, etc.). If the resulting file name is too long (more than 15 characters in most cases), an "Invalid pathname syntax" error will appear and the animation will be stopped.
- **1st Number** — Determines the first number used by the Numbered Frames option. The number is automatically incremented for every frame saved to disk. You won't normally have to set this.
- **Optimize** — This is used when creating animations to disk. The resulting animation will be compressed to use the Apple IIGS' special Fill Mode feature. The animation will play smoother and use less disk space. Use this option when the resulting animation will not be used by HyperStudio. The Numbered Frames and the 640 x 200 Pixels options will both disable this feature.
- **Allow Looping** — This is used when creating animations to disk. When enabled, Animasia 3-D creates an extra loop frame back to the beginning of the animation. When disabled, the animation will not have an extra loop frame. This option should be left on if the animation will be viewed by anything other than HyperStudio.

Click **Cancel** to not animate.

Click **OK** to begin the animation.

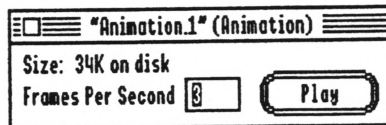
The animation is viewed by the current camera for the duration of the animation. You can use this to your advantage and view the animation from different cameras with subsequent **Animate** commands.

The animation can be stopped by three different methods:

- Clicking the mouse button.
- Pressing Command and Period at the same time.
- Pressing the ESC key.

Depending upon the stage of Animasia 3-D's calculations, the animation may stop immediately, or it may take a few seconds for the stop to register. In either case, the objects will stop drawing and the World window may not even show one object; the objects are still present, albeit not yet drawn. Choose **Redraw** from the **Image** menu to redraw all the objects. Also note that the time is set to the time at which the animation was stopped.

When Animating to Disk and the animation has completed, an Animation window will appear on the desktop.



Clicking on the Play button plays the animation at its full speed. See the Reference section on the Animation window for more information.

See the HyperStudio Tips section for detailed information on creating animations specifically for use with HyperStudio.

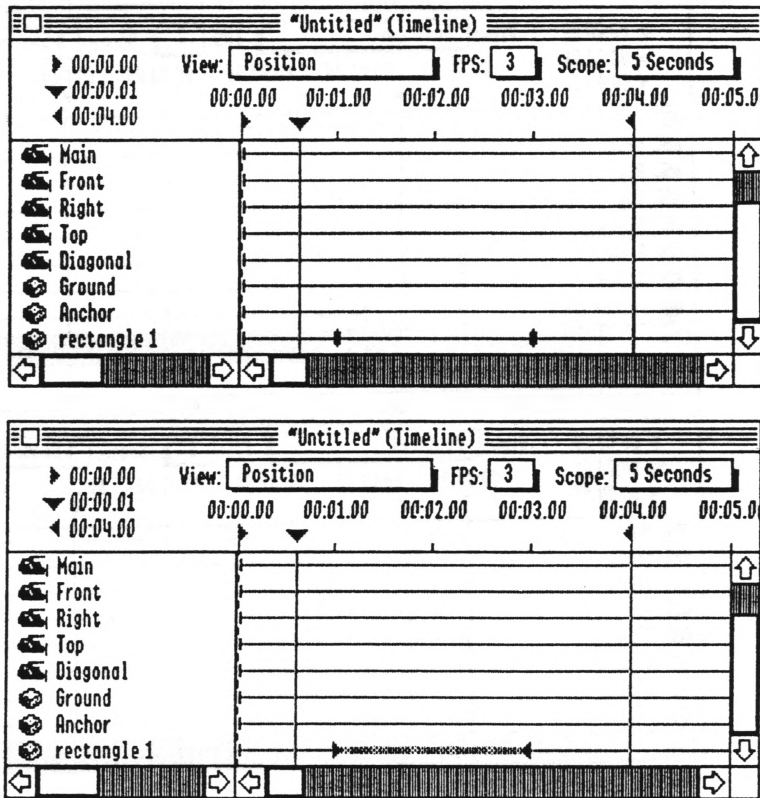
Note: When animations play, they loop back to the beginning to continue playing. If the animation was not completely generated, which could've happened if there was not enough disk space while generating, traces will appear in the animation after the first loop. The reason is because the final loop frame was never created. The final loop frame is responsible for correctly looping the animation back to the first frame. Animations intended for HyperStudio stacks will also exhibit this same behavior because a final loop frame should not be created for these animations. (The Allow Looping option in the Animate Options window should be turned off when Animating to Disk. HyperStudio will accept a final loop frame but will loop back to the beginning of the animation instead of holding at the last frame.) If there is no loop frame in an animation, the animation can certainly be played one time through, but just will not appear correctly after looping. The only way for the animation to loop correctly is to regenerate the animation from the beginning.

Leave Trails

Choose Leave Trails from the Animation menu to toggle whether or not objects will leave trails when they are animated. If there are trails left over from an animation, turning this option off will erase the trails.

Tween Attributes

Choose Tween Attributes from the Animation menu to convert pairs of selected Rest attributes to Start Tween and Stop Tween attributes. If an object has more than two selected Rest attributes, the first and last selected Rest attributes will be used to create a tween. Any attributes that fall in the middle of the two selected Rest attributes will be converted into Continue attributes.

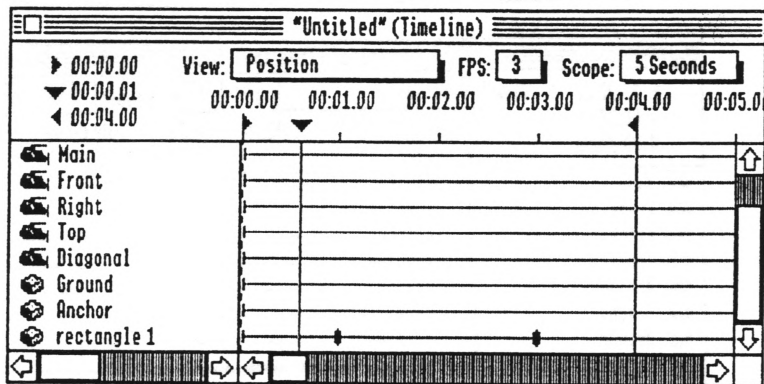
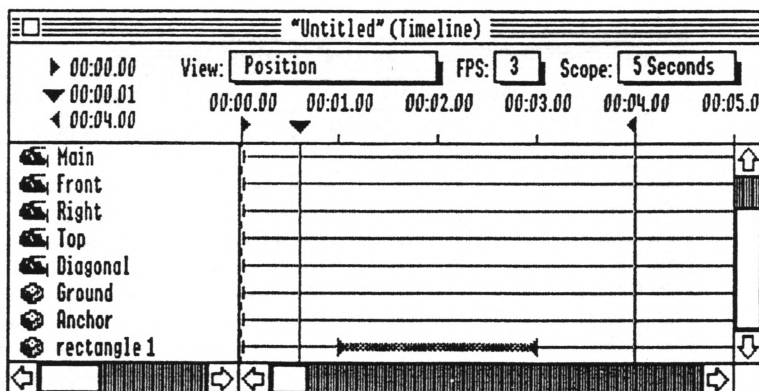


(The two Rest attributes for "rectangle 1" are converted into Start Tween and Stop Tween markers. The blue bar indicates a Tween.)

This menu item is available only when a Timeline window is frontmost.

Untween Attributes

Choose Untween Attributes from the Animation menu to convert pairs of selected Start Tween and Stop Tween attributes to Rest attributes. Any attributes that fall in the middle of the selected Start Tween and Stop Tween attributes will be converted into Rest attributes.



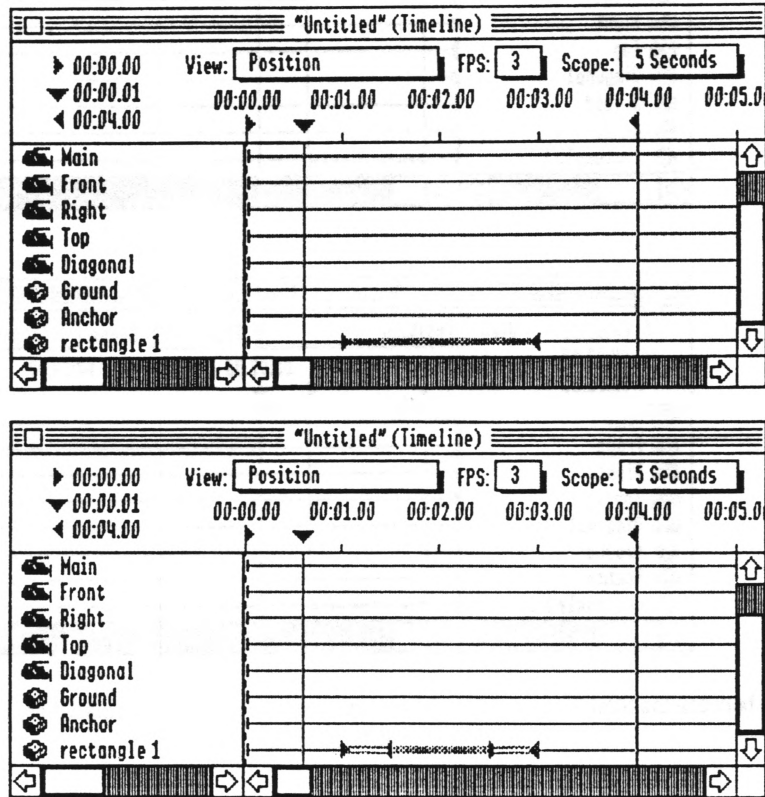
(The two Start Tween and Stop Tween markers for "rectangle 1" are converted into Rest markers. The blue bar is removed to indicate there is no Tween.)

This menu item is available only when a Timeline window is frontmost.

Add Accel / Decel to Tween

Choose Add Accel / Decel to Tween from the Animation menu to add pairs of Acceleration and Deceleration markers to a selected Tween. A selected Tween is a pair of selected Start Tween and Stop Tween attributes. Acceleration and Deceleration markers cause the Tween's in-betweening to speed up, go at a constant rate, and then slow gradually to a stop. Acceleration and deceleration are the keys to creating animations that do not look too mechanical.

Acceleration and Deceleration markers are only relevant when inside a tween, and if they are dragged outside the tween, they will be automatically deleted.



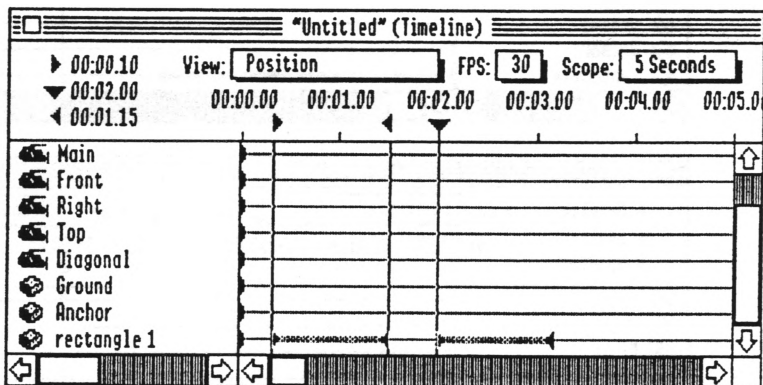
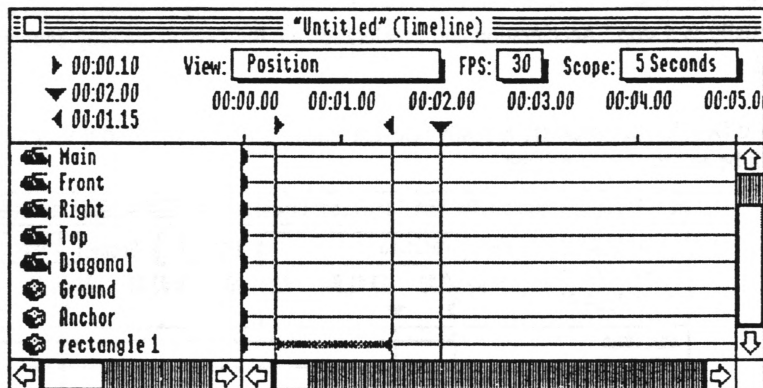
(A pair of Acceleration and Deceleration markers are added to the Tween.)

This menu item is available only when a Timeline window is foremost.

Tip: If either a Acceleration or Deceleration marker is desired, simply delete one or the other after creating both.

Duplicate Attributes

Choose Duplicate Attributes from the Animation menu to make an immediate copy of the selected objects' attributes. This menu item is available only when a Timeline window is frontmost.



(The attributes between the Start Time and Stop Time markers are duplicated and placed beginning at the Current Time marker.)

To duplicate a range of an object's attributes, a small setup is first required.

- Step 1. From the Timeline window, first choose which kind of attributes to duplicate by choosing the desired kind from the View menu.
- Step 2. The Timeline window's time markers need to be adjusted to indicate a range of time and a destination for the newly duplicated attributes. The time markers are the green, red, and black triangles at the top of the timeline. Click and drag the Start Time marker, which is the green triangle, to the beginning of the range of object attributes.
- Step 3. Click and drag the Stop Time marker, which is the red triangle, to the end of the range of object attributes. Any attributes which lie at or between the Start and Stop Time markers will be duplicated.
- Step 4. Click and drag the Current Time marker, which is the black triangle, to the point in time where the duplicated attributes should be placed. This is the destination. There should not be attributes already present at the destination.
- Step 5. Choose Duplicate Attributes from the Animation menu. If there are selected objects in the World window, those objects' attributes will be duplicated. If there are no selected objects, or the Control key is held down, a dialog box will appear so as to choose objects by their name.

Tip: To quickly duplicate the same set of attributes many times, you need only reposition the Current Time marker to a new time further along the timeline.

Tip: Holding down the Option key duplicates *all* of the kinds of attributes instead of just the kind of attribute indicated by the timeline's View. This is a powerful feature which can duplicate attributes that you may not have intended. If this happens, you can always choose Undo from the Edit menu, or you can manually delete the extraneous attributes.

Mark Object Position

Choose Mark Object Position from the Animation menu to create a new Position attribute at the current time for the selected objects. The new attribute inherits the position of the object at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Position, to see the results of this command.

This command is useful for creating a pause in an object's movement or for animating from a known point in time. For example, how would you create an animation where an object began to move at 00:00.00, stopped moving at 00:02.00, stayed at that position until 00:03.00, and then began to move some more until 00:05.00? The answer is to plan ahead and use the Mark Object Position command.

Step 1. Ensure that the Auto-Tweening option is turned on for this example.

Step 2. Start by creating an object at 00:00.00.

Step 3. Set the time to 00:02.00.

Step 4. Move the object to another part of the World window. The object will animate from the first place to the current position.

Step 5. Now set the time to 00:03.00.

Step 6. Choose Mark Object Position to create a new Position attribute at the current time of 00:03.00. We will be animating from this new attribute, not the one at 00:02.00.

Step 7. Set the time to 00:05.00.

Step 8. Move the object to another part of the window.

Step 9. Examine the Timeline to see the results, ensuring that the Timeline's View is set to Position. There should be two separate blue Tween bars next to the object's name. The gap between the blue tween lines indicates that the object does nothing for one second.

Step 10. Choose Animate to Window to verify the results.

Mark Object Orientation

Choose **Mark Object Orientation** from the **Animation** menu to create a new **Orientation** attribute at the current time for the selected objects. The new attribute inherits the orientation of the object at the current time, but does not take into account the **Auto-Tweening** option. Examine the **Timeline** window, ensuring that you've set the **View** to **Orientation**, to see the results of this command.

See the example with **Mark Object Position** to see how this command can be used.

Mark Object Size

Choose Mark Object Size from the Animation menu to create a new Size attribute at the current time for the selected objects. The new attribute inherits the size of the object at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Size, to see the results of this command.

See the example with Mark Object Position to see how this command can be used.

Mark Object Body Color

Choose **Mark Object Body Color** from the **Animation** menu to create a new **Body Color** attribute at the current time for the selected objects. The new attribute inherits the color of the object at the current time, but does not take into account the **Auto-Tweening** option. Examine the **Timeline** window, ensuring that you've set the **View** to **Body Color**, to see the results of this command.

See the example with **Mark Object Position** to see how this command can be used.

Mark Camera Position

Choose Mark Camera Position from the Animation menu to create a new Position attribute at the current time for the current camera. The new attribute inherits the position of the camera at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Position, to see the results of this command.

See the example with Mark Object Position to see how this command can be used.

Mark Camera Orientation

Choose Mark Camera Orientation from the Animation menu to create a new Orientation attribute at the current time for the current camera. The new attribute inherits the orientation of the camera at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Orientation, to see the results of this command.

See the example with Mark Object Position to see how this command can be used.

Mark Camera Field of View

Choose Mark Camera Field of View from the Animation menu to create a new Field of View attribute at the current time for the current camera. The new attribute inherits the field of view of the camera at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Field of View, to see the results of this command.

See the example with Mark Object Position to see how this command can be used.

Mark Camera Body Color

Choose Mark Camera Body Color from the Animation menu to create a new Body Color attribute at the current time for the current camera. The new attribute inherits the color of the camera at the current time, but does not take into account the Auto-Tweening option. Examine the Timeline window, ensuring that you've set the View to Color, to see the results of this command.

See the example with Mark Object Position to see how this command can be used.

HyperStudio Animations

Creating animations for use with HyperStudio requires a little extra planning for the animation to blend smoothly with HyperStudio's flexible environment. When choosing Animate to Disk, a few of the options in the Animate Options dialog box should be set a certain way:

- The 640 x 200 Pixels option should be set. This is the resolution that HyperStudio uses.
- The Optimize option *must* be turned off or HyperStudio will not display the animation's images correctly—the images will look like outlines of your objects.
- The Allow Looping option must be turned off or HyperStudio will incorrectly show the extra loop frame; the animation will not end with the last frame as it should but instead with the first.
- The Shades of Gray option can be turned on, but it requires a little extra effort for the animation to appear gray within HyperStudio. Follow the extra steps at the end of the following steps.

Using an Animation in Your HyperStudio Stack

The following information applies to HyperStudio version 3.0 or later. You can find the same information on pages 77-78 of the HyperStudio manual.

Launch HyperStudio and follow these steps:

- Step 1. Choose Open Stack from the File menu and select the stack that you want to add an animation to.
- Step 2. Move to the appropriate card where the animation will appear.
- Step 3. Choose Add a Button from the Objects menu.
- Step 4. After setting the options for your button, click OK. HyperStudio will then let you position the button on the card. Click outside of the button to continue.
- Step 5. The Button Actions dialog box will appear. From the list of Actions, choose the Play Animation option.
- Step 6. A standard Get File dialog box will appear. Find the animation that you had created with Animasia 3-D and click Open. (Or, if you had created an animation by saving as numbered frames, choose the first numbered frame.)
- Step 7. The first frame of the animation will appear in a small window on your stack's card. HyperStudio wants you to move and resize the window to your liking. (You can also slide the animation within the window.) The animation will play inside this window. When done, click outside the window. A dialog box will appear asking if you want to change the window's location or size because once it's set, it cannot be changed again without restarting from step 3. Click Done when satisfied, or else click Try Again.
- Step 8. The Button Actions dialog box will reappear one last time. Set any other options you would like. Finally, from the list of Actions, set the Rate of the animation and the number of times the animation will loop, or Repeat, itself. Don't worry if you don't know the Rate of the animation—both of these values can be changed later. Note: HyperStudio's animation Rate is not the same as Animasia 3-D's

Frames Per Second rate. HyperStudio's Rate is based on how many 1/60ths of a second a frame will hold before going to the next frame. To convert Animasia 3-D's Frames Per Second to HyperStudio's Rate, do the following math: Rate = 60 divided by Frames Per Second.

Step 9. Click on the new button to play the animation. The animation won't be visible until the button is clicked.

If you had turned on the Shades of Gray option when Animating to Disk, HyperStudio won't expect the animation to be gray and therefore will look ugly. Instead, we have to set the palette of the stack's card by tricking HyperStudio. To do so, follow these steps:

Step 1. Choose Add Clip Art from HyperStudio's File menu.

Step 2. The standard Get File dialog box will appear. Find and Open the animation. (Or, if you had created an animation by saving as numbered frames, choose the first numbered frame.)

Step 3. The first frame of the animation will appear. HyperStudio wants you to select a portion of the frame to add to your card. All we want is the palette from the frame, but we will have to take a piece of the frame to get the palette. With the cross-shaped cursor, drag and select a tiny portion of the frame. Click OK.

Step 4. You will be returned to your card but you should notice that the card's palette has already changed to that of the first frame. Click and drag the tiny portion of the image to an inconspicuous place on the card. The animation will now play back with its gray palette.

Animation Tips

Looking to the advice of professional animators, there are fundamental principles for creating interesting and life-like animations. Timing, squash and stretch, anticipation, and exaggeration are a few of the main principles to keep in mind.

Timing

Timing is by far the most important technique to master. Timing affects the audience's perception of an object. Good timing involves preparing for the action, performing the action, and then following with the reaction. Spend too much time on any one of these areas and you'll lose the audience's attention. Spend too little time and the action will go right by. The best thing to do is to act out the action yourself and time it with a stopwatch. Remember that natural motions start out slowly, accelerate in the middle of the animation and then slow down toward the end.

Proper timing of motions will impart your objects with a sense of identity. Until an object moves, we have no idea what it's made of. Consider a ball. Is it filled with rubber, helium, or lead? With the correct timing, a rubber ball will bounce almost to its original height. A lead ball will barely bounce once. When a rubber ball is dropped and hits the ground, the ball flattens and spreads out momentarily. When it bounces up, the ball elongates and then returns to its original round shape. This is squash and stretch. It may seem trivial to mention, but without it, the bouncing action would not indicate the ball is made of rubber.

Anticipation is another important principle of animation. Anticipation is when an object shifts its weight back before it goes forward. A good example is of a person about to hit a baseball. Before swinging the bat forward, he will bring it back so as to gain the most momentum in the swing. Many actions are like this. To get the best motion, try different ways of performing the action and choose the one that works best. Practice is essential to a successful animation skills.

Objects

Detailed objects take a longer time to compute than simpler ones. For this reason, you should try to create objects with a minimum amount of surfaces, points, and edges. If an object needs to be detailed, there are two approaches you can use to keep the object out of the way, which will also speed up camera changes. The first method is to put the object in a group and hide the group. Because the object is hidden, you will have to remember to unhide the group before creating the animation. The second method makes the object appear as a box. From the Appearance menu, choose Box. This vastly reduces the time an object needs to be computed while still showing the object's relationship to other objects. When it comes time to animate, an option in the Animate Options dialog box will automatically make any boxed objects appear as normal models. The option is called Objects Appear As Models.

Cameras

Because it's so easy to move and rotate the camera, creating flying-type animations is a signature of computer graphics. However, camera movements are most effective when not overused. With proper planning, the camera can be repositioned from shot to shot to break up a predictable visual continuity. Low camera angles impart a sense of grandeur and awe to the viewer. High camera angles give a sense of omniscience over the fate of the actions of the objects and characters. Camera angles that look directly upon a scene relate the actions on equal terms with the viewer.

A practical reason for not moving or rotating the camera too much is to keep the size of the animation from becoming gigantic. Whenever there is a change from one frame to the next, only the changed part is recognized and saved. Frames that change little from frame to frame play back easily. However, frames that change a lot, usually resulting from moving or rotating the camera, make the playback work harder. The animation may not play smoothly and the animation's file size may balloon.
